SUMMARY

S.1 PROPOSAL AND OBJECTIVES

Seattle Public Utilities (SPU), which is responsible for the overall management of solid waste generated by citizens, businesses, and institutions in the City of Seattle, proposes that the City adopt and implement a new Solid Waste Management Plan titled *On the Path to Sustainability*. The City has recently issued a Public Review Draft of the 1998 Plan (Draft Plan). Once adopted by the Seattle City Council, the 1998 Plan will set the overall, long-term direction of SPU's solid waste management efforts in the areas of waste reduction, recycling, collection, transfer, processing, and disposal.

The policies and program directions recommended in the Draft Plan reflect the City's overall goal of promoting sustainability as well as SPU's fundamental goals for solid waste management. These fundamental goals, or values, are: protecting public and environmental health, improving cost effectiveness and system efficiency, and responding to customer and community needs. The Draft Plan also establishes more specific goals for the City's solid waste system and programs. Goals that could ultimately lead to programs or facilities with the potential to create adverse environmental impacts are:

- To increase waste reduction and resource conservation.
- To maintain current recycling successes and expand cost-effective recycling opportunities.
- To increase the efficiency, fairness, convenience, and accessibility of services.
- To expand local recycling markets and increase purchases of recycled-content products.
- To increase consumer and producer responsibility for sustainable waste management practices.
- To improve sustainable waste management and resource conservation practices in all City operations.

S.2 NO ACTION ALTERNATIVE

The No Action Alternative would continue current programs and services developed under the guidance of the City's 1989 Solid Waste Management Plan, *On The Road to Recovery*. Seattle provides some of these services directly and some through contracts with private companies. Specific elements of the No Action Alternative include:

- **Waste Reduction**. Seattle's current programs are aimed at preventing materials from entering the waste stream and include promotional, educational, and technical assistance programs; programs focused on organic materials such as Master Composter training, compost bin distribution, grasscycling promotions, and discounts on mulching mowers; and programs focused on keeping moderate risk waste out of garbage and yard waste.
- **Recycling**. Seattle's current recycling programs include:
  - A voluntary curbside collection program serving single and multi-family homes.
  - A voluntary yard waste collection program serving single-family and multi-family homes.
  - Drop-off recycling for self-haul customers at the City's two transfer stations.
  - Education, outreach, and technical assistance programs.
  - Rate incentives to encourage recycling.

In addition, businesses can contract for recyclables and yard waste collection services directly with private companies. Buy-back centers and facilities for handling construction and demolition debris (C&D debris) are also available to serve business customers.

- **Collection**. The City of Seattle contracts for separate collection of residential garbage, recyclables, and yard waste. North of the Ship Canal, residential customers segregate recyclables by material. South of the Ship Canal, recyclables, except for glass, are commingled into a single container.

  Under the current system, residential recyclables and yard waste are collected more frequently in the northern area of the City than in south Seattle. For example, household recyclables are collected once a month south of the Ship Canal and every week north of the Ship Canal. In the spring and summer, yard waste from residences is collected weekly north of Yesler and every other week south of Yesler. In winter, yard waste is collected monthly throughout the City.

  In 1996 Seattle also decided to exercise its right under State law to contract for garbage collection services to businesses, and is currently negotiating commercial collection contracts with the franchised haulers. A number of companies also compete to collect recyclables and yard waste from businesses. Seattle does not contract for those services.

- **Transfer and Processing**. The City of Seattle owns and operates two transfer stations: the North Recycling and Disposal Station (North Station) and South Recycling and Disposal Station (South Station). Current activities at these two stations include garbage transfer; self-haul yard waste, garbage, and recyclables collection; and, at the North Station, transfer of curbside-collected yard waste. The North Station is located near Wallingford and Fremont. The South Station is located in the Duwamish industrial area near the South Park neighborhood.

  Several private transfer and processing facilities also handle solid waste materials generated within the City. The Third and Lander facility is located in south-central Seattle and accepts garbage generated by businesses, separated C&D debris, residential recyclables, residential yard waste, and a small amount of commercial self-haul waste. The Eastmont Transfer Station, located on West Marginal Way Southwest, accepts commercially collected garbage generated by businesses as well as self-hauled and commercially collected C&D debris. The Recycle America facility processes recyclables. The Cedar Grove Composting Facility, located in southeast King County, handles the City's curbside-collected and self-hauled yard waste. The Seattle Intermodal Facility at the Union Pacific rail yard accepts enclosed containers of compacted waste as well as C&D debris in tarped, open-top containers.

- **Disposal**. Seattle has a long-term contract with Washington Waste Systems (a subsidiary of Waste Management, Inc.) for long-haul landfill disposal of garbage. Currently, Seattle's garbage is disposed of at the Columbia Ridge Landfill and Recycling Center near Arlington, Oregon. Seattle also monitors two closed landfills at Midway and Kent. These landfills opened in the mid-1960s and closed in the mid-1980s. Seattle is obligated to monitor these landfills for a minimum of 30 years.

- **Special Waste Management**. Special wastes are solid wastes requiring special handling, processing, or disposal, and can include items such as household hazardous wastes and biomedical wastes. Seattle operates two household hazardous waste facilities: one at the South Station and another near Aurora Avenue North and North 128th Street. Under Seattle City Ordinance 114500, biomedical waste must be transported by an infectious waste hauler permitted by the Seattle-King County Health Department.

S.3 PROPOSED ACTION

The Proposed Action, which consists of adopting the policies, programs, and services recommended in the Draft Plan, is designed to help Seattle reach its overall goals of protecting public and environmental health, improving cost effectiveness and system efficiency, and responding to customer and community needs. Under the Proposed Action, Seattle would continue its current program for long-haul transport, disposal, and special waste management. Major issues and policies addressed in the Draft Plan include:

- ***What level of effort should the City put into promoting waste reduction?*** The Draft Plan recommends that Seattle expand its waste reduction efforts with an emphasis on reducing the amount of paper in the garbage and increasing on-site management of organic materials. The Draft Plan also recommends that Seattle adopt a variable can rate for yard waste collection, thereby encouraging more on-site management of yard waste.
- ***How aggressively should Seattle seek to increase its recycling rate?*** The Draft Plan recommends that Seattle:
  - Add materials to its curbside collection program based on market conditions and customer demand.
  - Expand multi-family participation in curbside recycling by providing garbage rate incentives and helping to overcome physical barriers such as lack of space for containers.
  - Expand small business participation in curbside recycling by adding small businesses to its residential curbside program. The Draft Plan also recommends considering increased economic incentives for businesses to recycle through changes to commercial garbage rates.
  - Add a recycling center for self-haul customers at the City's South Recycling and Disposal Station (South Station), including opportunities for salvaging and self-haul C&D debris recycling, and provide rate incentives to encourage self-haulers to use the South Station.
  - Expand its involvement in developing markets for goods made with recycled materials.
  - Provide incentives for the private sector to develop a facility to compost or otherwise process food into soil amendments or other useful products. The Draft Plan also recommends encouraging development of expanded composting capability in the region.
  - Provide economic development incentives for recyclables processors and manufacturers to locate in Seattle.
- ***What approach should be used for managing yard waste?*** The Draft Plan recommends continuing Seattle's programs for collecting and composting yard waste with some modifications: eliminating transfer of curbside-collected yard waste at the City's North Recycling and Disposal Station (North Station) and banning plastic bags from the residential curbside yard waste collection program. Under the recommended process for rebidding residential collection contracts, Seattle could also ask for prices for co-collecting and co-composting yard waste/vegetative food waste.
- ***What approach should be used for maximizing the efficiency and equity of collection and transfer?*** Seattle's residential contracts expire in 2000. The Draft Plan recommends that, when rebidding its residential collection contracts, the City establish uniform collection service citywide; specify collection frequencies for recyclables, yard waste, and garbage; and request prices for collection and processing of vegetative food waste/yard waste and food waste only. (Recommended collection frequencies include weekly garbage collection; every-other-week recyclables collection; monthly yard waste collection in the winter; and every-other-week yard waste collection in the spring, summer, and fall.) The

Draft Plan also recommends same-day collection of garbage, yard waste, and food waste in a given neighborhood and city-wide commingled recyclables collection. In addition to specifying these changes, the Draft Plan recommends that the City ask for prices and proposals from private companies for additional changes that could increase system efficiency.

- ***What role should the City's Recycling and Disposal Stations play in the future?*** The Draft Plan recommends eliminating yard waste transfer at the North Station, adding a self-haul recycling center at the South Station, creating incentives for self-haul customers to use the South Station, and looking into purchasing adjacent property at the North Station in order to eventually provide an improved self-haul recycling center there as well. Other facility improvements, such as seismic upgrades to strengthen buildings for earthquake protection, are also planned. The future role the City's stations will play for curbside-collected residential waste or commercial waste will depend on the results of the City's bidding process for residential collection contracts and the outcome of contract negotiations for commercial garbage collection.
- ***What level of effort should the City put into market development, producer responsibility, and sustainable building?*** The Draft Plan recommends that the City implement the Sustainable Building Action Plan; encourage producers to reduce packaging and take back selected materials; and substantially increase the City's involvement in market development activities including providing economic incentives for processors and manufacturers of recyclable materials to locate within the City.
- ***What level of effort should the City put into improving its own solid waste practices?*** The Draft Plan recommends that the City make a major effort to increase its own level of waste reduction, recycling, and purchasing of recycled products. The Draft Plan also recommends that the City implement sustainable building practices in City projects.
- ***How can the City best ensure that it is responsive to the needs of all its diverse customers and of its neighborhoods?*** The Draft Plan recommends providing uniform residential collection service citywide, rather than the current system which has more frequent collection in the northern part of the City. The Draft Plan also recommends continuing Seattle's programs to prevent and clean up litter and graffiti.

S.4 ALTERNATIVES TO THE PROPOSED ACTION

The Draft Plan also identifies several other options for accomplishing the goals identified in the Plan. These include:

- ***Variable Can Recycling Rates***. This alternative would charge customers for recycling; the charge would increase proportionally with the amount of material recycled, thereby creating an economic incentive to reduce waste.
- ***Grass Ban***. This alternative would ban grass from curbside-collected yard waste and from City transfer stations, in order to encourage on-site management through grasscycling or on-site composting.
- ***Mandatory Recycling Participation***. This alternative would require multi-family and/or business customers to sign up for recycling service.
- ***Bans.*** This alternative would ban additional materials, such as clean paper and cardboard, from garbage collection, and at the extreme could involve banning all non-organic recyclables from garbage.

- ***Mandatory Take-Backs.*** This alternative would require that product manufacturers, wholesale companies, and/or retail companies take back certain materials for re-manufacture or reuse.
- ***Mandatory Food Waste Separation by Businesses and/or Residences.*** This alternative would be coupled with development of a food waste composting facility and with collection programs for food waste generated by businesses or residences.
- ***Collection of Additional Materials***. Under this alternative, SPU would add to its curbside collection programs additional materials that do not appear to be cost-effective, in order to reduce the amount of garbage requiring disposal.
- ***Every-Other-Week Garbage Collection/Weekly Food Waste Collection***. This alternative would reduce the frequency of garbage collection from weekly to every other week, but would be coupled with weekly food waste collection.
- ***Other Commingled or Co-Collection Options.*** This alternative would involve collecting more than one material in a single truck, either mixed together (commingled) or in a truck with up to four separate compartments (co-collection). Although they are not prohibited, these collection options are unlikely to result from the recommended collection contract bidding process because of the collection frequency requirements recommended in the Draft Plan. (Commingled collection of yard waste and vegetative food waste is evaluated as part of the Proposed Action.)
- ***Commingled Self-Haul Material Recovery Facility at the South Recycling and Disposal Station.*** This alternative would involve developing a material recovery facility where commingled self-haul garbage and recyclables are delivered to a separate, fully enclosed building on the South Station site for processing. Processing would likely include separation of recyclable materials from garbage and segregation of recyclables by material type using a conveyor and pickline.
- ***Yard and Food Waste Transfer at the North Recycling and Disposal Station.*** This alternative would include the transfer of curbside-collected yard waste and/or food waste at the City's North Station.

S.5 Major Conclusions Regarding the Proposal and Alternatives

Washington State SEPA rules and Seattle's SEPA ordinance require that EIS summaries identify major conclusions, significant areas of controversy and uncertainty, and issues to be resolved. Potential environmental impacts, mitigation measures, and significant unavoidable adverse impacts for the Proposed Action and alternatives are summarized in **Table S-1**.

Based on the environmental review conducted for this EIS, several potentially adverse impacts of the Proposed Action were identified. The following discussions describe major issues together with measures to avoid, reduce, or mitigate impacts. Because the Proposed Action is a non-project or programmatic proposal, mitigation measures generally are not site-specific. Where impacts could result from implementation of new residential collection and processing contracts with private haulers, submittal and contract requirements that could help reduce adverse impacts are also identified.

- **Construction Impacts from the Development of New Facilities.** The Draft Plan recommends construction of a new self-haul recycle center at the City's South Station; economic incentives for recyclables processors and manufacturers to locate within the City; incentives for a new private-sector food waste processing facility; and, if nearby property is purchased, possibly improved recycling facilities at the City's North Station. In addition, the Draft Plan's recommended process for rebidding residential collection contracts could lead to new private yard waste or yard waste/vegetative food waste composting facilities and, possibly, to new specialized transfer stations.

  Development of these facilities could require modifications to existing infrastructure, eliminate wildlife habitat in certain locations, and result in short-term construction impacts including water and wind erosion of exposed soils and stockpiles, accidental spills of fuels and lubricants from construction equipment, requirements for special foundation conditions, sedimentation of nearby waterways, construction noise, dust and particulate emissions from construction vehicles, and traffic conflicts with construction vehicles. Development of a new recycle center at the South Station potentially could involve excavation into garbage since the station is located on the site of an old landfill. Additional site specific construction impacts, such as impacts to sensitive areas, also could result.

  Enforcing contractors' compliance with noise control ordinances and the requirements of their approved erosion and sedimentation control plans, designating routes for construction vehicles, and providing temporary traffic control during construction would help reduce but not eliminate adverse construction impacts. In addition, site-specific geotechnical investigations should be conducted at the South Station to determine specific foundation requirements for the new recycling center. Other mitigation could be needed depending on site-specific conditions.

- **Impacts from Changes in Level and Type of Residential Collection Service.** The Draft Plan recommends changing to citywide, every-other-week collection of recyclables and yard waste, except in winter when yard waste would be collected monthly. This would reduce the frequency of recyclables and yard waste collection in the northern part of the City while increasing the frequency of recyclables collection in the southern part of the City. In addition, residential customers north of the Ship Canal could be asked to change from segregating their recyclables to using commingled recycling containers. If food waste collection is implemented, residential customers could be asked to segregate their food waste into a separate container or to add vegetative food waste to their yard waste.

  Potential adverse impacts resulting from these changes in service could include odor impacts from less frequent yard waste collection in the northern part of the City; increased amounts of recyclables placed in the garbage in the north end due to less frequent recyclables collection, but decreased amounts of recyclables in the garbage in the south end due to more frequent collection; and an increased potential for leakage and odor associated with separate food waste collection. To the extent that yard waste or food waste begins to decompose anaerobically, changes in collection could aggravate odor problems at composting facilities. Changes in collection also would reduce the total miles traveled by collection vehicles and

would reduce the total amount of air emissions; however, with the exception of nitrogen oxides, impacts from vehicle air emissions such as PM_{10} and carbon monoxide are more closely related to daily, rather than cumulative annual traffic volumes.

Mitigation for odor impacts could include providing aerated containers for yard waste and leak-proof containers for food waste; this would also help control odors at composting facilities.

- **Impacts from Changes to the City's North and South Recycling and Disposal Stations.** In addition to the construction impacts described above, off-site impacts associated with the operation of these facilities would also continue. Off-site impacts would include: noise from traffic, heavy equipment, and depositing recyclables in containers; odor impacts from garbage and yard waste transfer; localized increases in PM_{10}, carbon monoxide, and other vehicle air emissions; and localized access problems such as off-site queues. As the City's population grows, impacts associated with operating the two stations would continue to increase.

  Due to a smaller facility site and the proximity of nearby residences, off-site impacts at the North Station would tend to be greater than at the South Station. The Draft Plan does, however, recommend a number of changes that would reallocate functions and traffic between stations. These changes include shifting transfer of curbside-collected yard waste from the North Station to the South Station or other stations and providing financial incentives for self-haulers to use the recycle center at the South Station. These measures would reduce the potential for odors at the North Station and would reduce impacts from self-haul traffic. If nearby property is purchased and developed to provide enhanced recyclables collection at the North Station, off-site noise impacts could result.

  Impacts due to increased use would occur at the South Station. Operation of the new recycle center at the South Station could create off-site noise impacts. Food waste transfer, if implemented, could increase truck traffic, increase discharges to the sanitary sewer, and increase noise and odors somewhat. The effects of these impacts would be reduced to some extent, however, because of the South Station's location in an industrial area. Off-site queues, primarily due to self-haul traffic on weekends, could result, and noise from the recycle center could potentially be heard at certain residences on the West Seattle-White Center hill.

  Mitigation measures could include incorporating measures to reduce off-site noise impacts into the orientation and design of new recycle center(s); monitoring and evaluating noise and odor complaints on an ongoing basis; designing new recycle center(s) to be compatible with future installation of noise barriers should ongoing monitoring indicate they are warranted; if needed, providing a separate entrance to the new recycle center at the South Station to reduce the potential for off-site queues; if needed, adding a right-turn traffic storage lane on Fifth Avenue South or a clockwise traffic circulation pattern; and possibly implementing self-haul rates that would encourage self-haul use of the South Station recycle center at off-peak times. If food waste transfer is proposed, measures to reduce dust and odors, such as the misting

and odor control system that has been installed at the North Station's transfer building, could be installed at the South Station.

- **Compatibility of New and Existing Composting Facilities with Nearby Land Uses.** The Draft Plan's recommendations could lead to the development of new food waste and, possibly, yard waste composting facilities. Seattle's residential yard waste would continue to be composted. Business and residential food waste could also be collected and composted. Composting facilities could create the potential for off-site odor and noise impacts, especially if they are sited near residential or commercial areas on sites without substantial buffers. Facilities that accept food waste, in particular, could attract pests such as rodents and insects.

  Noise impacts could result from the operation of heavy equipment required for shredding and mixing materials; forming, turning, and moving compost piles; and screening the compost products. Compressors and other aeration equipment also could generate noise at composting facilities.

  Odor problems are typically caused by the anaerobic (without oxygen) decomposition of food and yard waste. Therefore, odor problems at yard waste composting facilities would tend to be aggravated if yard waste is delivered in sealed containers such as plastic bags. All other things being equal, food waste composting facilities would have a greater potential to create odor problems because of the chemicals formed as fats, meats, and dairy products decompose. For both food waste and yard waste, conducting certain operations outdoors, such as waste receiving, shredding, mixing, and initial composting, would tend to aggravate odor problems.

  Mitigation measures to reduce the potential for off-site impacts, especially odor, noise, and pests, include: siting facilities well away from residences and commercial businesses; providing adequate buffers, possibly with berms and screening; quickly moving materials from receiving areas into active compost piles; providing forced aeration of compost piles or windrows; enclosing operations most likely to cause odor problems, such as the tipping, mixing, grinding, and composting areas; and treating exhaust air from enclosed areas using biofilters or other technologies.

  Because composting will occur at privately owned and operated facilities, Seattle could use performance specifications and submittal requirements in its upcoming residential collection bidding process to encourage private facilities to be sited, designed, and operated in a manner that reduces potential off-site odor, noise, and pest impacts. For example, bidders could be asked to submit information on site characteristics and compatibility with the zoning of surrounding properties; odor management control for each step of the receiving, mixing, composting, curing, and product screening process; pest control programs; surface water runoff and leachate collection and treatment systems; and markets for the end product. The facility could also be required to have an operator training program and to conduct internal environmental management audits so operations problems can be quickly detected and resolved. As part of its residential bidding process or as a requirement for obtaining

incentives for developing a food waste processing facility, the City could also disallow certain processes, or require certain areas to be enclosed with exhaust air treatment.

- **Impacts of New Technologies.** A number of new technologies could be proposed in response to the Draft Plan's recommended process for rebidding its residential collection contracts and in response to the recommended incentives for a private sector food waste processing facility and for recyclables processors and manufacturers to locate in Seattle. Recyclables processing and manufacturing could result in a wide range of operational impacts including traffic, noise, odor, and air emissions. Impacts would be site and technology-specific. Compliance with the requirements of Seattle's land use and zoning code would help mitigate the potential for off-site impacts. Other mitigation would also be site and technology-specific.

  For food waste, the proposed processing technology would likely be composting although less widely used processes such as anaerobic digestion or animal feed conversion could be proposed. Impacts and mitigation would be similar to those at composting facilities and would include traffic, odor, noise, bioaerosols, the potential to attract pests, and the potential for contamination in the final product. Because some processes at these facilities, such as fermentation and anaerobic digestion, would occur in enclosed vessels, the potential for off-site odor impacts would be somewhat reduced. There is also more uncertainty with the markets for the final products of anaerobic digestion, which includes methane and a residual requiring land application.

  It is also possible that a new collection technology, such as a collection system that uses detachable sealed containers and eliminates the need for traditional transfer stations, could be proposed for garbage, yard waste, and/or food waste. This type of technology would reduce the demand and impacts of traditional waste transfer but would require smaller staging areas located throughout the City near major collection routes, possibly resulting in localized adverse aesthetic, traffic, and noise impacts. Odor and water quality impacts would depend on the degree to which the enclosed containers were properly sealed. Mitigation would include inspection and cleaning programs for containers and siting staging areas adjacent to compatible land uses.

- **Potential Public and Worker Health and Safety Risks.** Facilities that handle garbage, yard waste, food waste, and recyclables create certain health hazards including: worker safety risks due to the operation of heavy equipment; the potential for disease transmission from pests such as rodents; exposure to hazardous chemicals from accidental spills; and, for composting facilities, worker exposure to bioaerosols—micro-organisms or microbial fragments entrained on dust or water droplets in the air.

  Mitigation measures to protect worker and public health and safety include providing ongoing health, safety, and first aid training for workers; spraying water to reduce dust and bioaerosols; providing hearing protection to workers; and keeping facilities clean to prevent problems with pests. Because all composting facilities and some transfer stations would be privately owned and operated, Seattle could use submittal and specification requirements in

its upcoming bidding process for residential collection to help ensure that appropriate health and safety measures are implemented at those facilities.

- **Potential for Spills.** Accidental spills of moderate risk waste could occur at the City's two household hazardous waste collection facilities and, if materials are inadvertently placed in the garbage, along collection routes, at transfer stations, along long-haul routes, and at the landfill. Spills can expose workers to potentially harmful chemicals and can contaminate soil and water. Mitigation includes educational programs to keep hazardous materials out of the garbage, worker training to identify hazardous materials, health and safety plans for haulers and transporters, designing household hazardous waste collection facilities with containment measures, and providing operators with other items to help control spills. All of these measures are in place at Seattle's facilities.

- **Potential for Illegal Dumping.** In order to encourage on-site management, the Draft Plan recommends implementing a variable can rate for residential yard waste collection, which is currently provided on a subscription basis with a fixed charge per month. A possible outcome would be an increase in illegal dumping of yard waste. Illegal dumps are unsightly and can create food and shelter for rodents and other pests, localized odor problems, and localized surface water contamination. Mitigation for illegal dumping could include increased education by SPU and increased enforcement by the Seattle-King County Health Department.

- **Ongoing Impacts from Landfill Disposal.** The Draft Plan recommends continuing Seattle's long-haul transport and landfill disposal program. Potential impacts include air emissions along transport routes and from operating landfill equipment; odors along routes and at the landfill's active face; odors and health hazards from landfill gas; the potential for surface and ground water contamination; erosion associated with the construction of new landfill cells; habitat conversion; and wildlife displacement. Measures identified in the City's EIS on long-haul transport and disposal, such as special liner systems to contain waste and leachate and closing and revegetating landfill cells that have reached capacity, are being implemented to reduce, eliminate, or mitigate these impacts.

S.6 Effects of Deferring the Proposed Action

A delay in adopting the Draft Planwould essentially result in Seattle continuing its current practices for managing solid waste. Without adoption of the 1998 Plan, Seattle would not be able to take advantage of the full range of opportunities for innovation and efficiency in rebidding its collection contracts. In addition, further progress toward waste reduction and recycling would be deferred, thereby increasing the potential adverse environmental impacts from disposal. To the extent that deferring the Proposed Action also defers development of modifications to existing facilities or to the development of new, privately owned facilities, environmental impacts associated with the development of those facilities would also be deferred.

Table S-1 Summary of Alternatives, Impacts and Mitigation
Seattle 1998 Integrated Solid Waste Management Plan Programmatic EIS

Alternatives/Impacts			Mitigation for the Proposed Action	SUAI [1]
No Action	**Proposed Action**	**Alternatives to the Proposed Action**		
Continue Existing Programs; exercise right to contract for garbage collection from businesses	• Expand waste reduction, focusing on paper and on-site organics management, through education, technical assistance, and variable can yard waste rate incentives. • Expand recycling by collecting more curbside materials, expanding multi-family and small business participation, developing a self-haul recycle center at SRDS, [2] including C&D debris recycling and providing incentives for food waste composting and recyclables processing facilities. Consider property aquisition at NRDS [3] for recycling. • Implement producer responsibility, product stewardship, and sustainable building programs. • Provide uniform residential collection frequency for garbage (weekly), yard waste (bi-weekly except winter), and recyclables (bi-weekly) citywide; recommend commingled recyclables collection citywide; and consider residential food waste or vegetative food waste/yard waste co-collection; encourage collection of all materials on the same day in a given neighborhood; and shift curbside yard waste transfer from NRDS to SRDS or private station(s). • Recommended process for rebidding residential collection contracts could lead to reallocation of materials among transfer stations, to new transfer and processing facilities, and/or to new technologies. • Continue long-haul transport landfill disposal and special waste programs.	• Grass ban or variable rate for grass. • Mandatory business or multi-family signups for recycling. • Variable can recycling rates. • Banning additional materials from garbage. • Collection of additional materials. • Other commingled or co-collection options. • Commingled Material Recovery Facility (MRF) at SRDS. • Yard waste/food waste transfer at NRDS. • Bi-weekely garbage collection.		

[1] Significant Unavoidable Impact
[2] SRDS - South Recycling and Disposal Station
[3] NRDS - North Recycling and Disposal Station

Table S-1 Summary of Alternatives, Impacts and Mitigation (Continued)
Seattle 1998 Integrated Solid Waste Management Plan Programmatic EIS

Alternatives/Impacts			Mitigation for the Proposed Action	SUAI
No Action	**Proposed Action**	**Alternatives to the Proposed Action**		
Transportation: Over the planning period, growth would increase truck and self-haul traffic near transfer stations, which could aggravate existing off-site queuing problems at NRDS.	**Transportation**: Increased waste reduction efforts would help alleviate traffic increases associated with growth. Changes in residential collection frequency would redistribute collection trips within the City, with relatively fewer trips in the north end and more trips in the south end. If food waste collection is added, an additional trip per week would be added along collection routes. Development of a new recycle center at SRDS along with incentives for self-haulers to use that station would alleviate off-site queuing problems at NRDS, but could create similar problems at SRDS, especially on weekends since by 2014, peak weekend traffic could total 1700 average daily trips. Shifting yard waste transfer to SRDS and possibly adding food waste transfer would increase truck traffic at SRDS, especially on weekdays. The proposed process for rebidding residential collection contracts could reallocate truck traffic among private and public stations; cumulative impacts of this change together with other proposed changes would likely be most severe at SRDS where, without mitigation, off-site queues could exceed 800 feet. Impacts at new transfer or processing facilities would be site-specific and would depend on the condition of surrounding road networks and existing traffic levels. If a collection technology that does not use traditional transfer stations is proposed, traffic impacts could result at container staging areas.	**Transportation**: Traffic impacts at a self-haul MRF at SRDS would be similar to those from the proposed recycling center. A grass ban would decrease yard waste tonnage by 30 to 35 percent, which would reduce truck traffic at transfer stations. Mandatory participation in curbside recycling would reduce trips at the City's stations to a minor degree, but increase traffic at Recycle America, all other things being equal. Food waste/yard waste transfer at NRDS would increase weekday truck traffic by about 34 average daily trips, further aggravating peak weekday queues.	**Transportation**: At SRDS, develop a separate entrance to the new recycle center as far north along Fifth Avenue South as possible, or provide a clockwise circulation pattern around the site; monitor peak day traffic operations and queuing and if ingress queues exceed on-site storage, add a southbound right-turn lane or consider implementing off-peak pricing. For new recyclables processing facilities, consider requesting information on site access and traffic impacts as a condition of qualifying for economic development incentives. For new composting facility(ies), consider using submittal and specification requirements to encourage proposers to account for traffic impacts in the siting and design of new facilities. Other mitigation would be site specific.	**Transportation**: Impacts at SRDS could be significant, depending on the effectiveness of incentives to encourage self-haulers to use that station and the effectiveness of mitigation. Traffic impacts at new facilities could be significant, depending on site-specific conditions.

Table S-1 Summary of Alternatives, Impacts and Mitigation (Continued)
Seattle 1998 Integrated Solid Waste Management Plan Programmatic EIS

Alternatives/Impacts			Mitigation for the Proposed Action	SUAI
No Action	**Proposed Action**	**Alternatives to the Proposed Action**		
Air: Waste reduction programs could result in localized impacts from backyard composting if improper composting methods are used. Localized problems with odors from yard waste and garbage at the curb and due to fumes and odors from collection trucks could occur at certain locations but are not likely to exceed air quality standards. Impacts from air emissions would be greatest near transfer stations, especially if queues develop. Impacts within transfer buildings include elevated levels of PM_{10} and carbon monoxide as well as odor. The potential for off-site odor impacts from operating transfer stations would be greatest at NRDS due to the proximity of residences. Centralized yard waste composting (currently at Cedar Grove) could result in off-site odors especially during times of high grass content in yard waste; however, Cedar Grove's operating permit modifications which limit the amount of material received, could help reduce these impacts. Ongoing long-haul transport and landfill disposal of garbage would generate fugitive dust, vehicle emissions, landfill gas emissions, and odors. Closed landfills also have some potential to generate landfill gas. Air impacts from special waste handling include emissions from incineration of medical waste and air emissions from accidental spills at the City's household hazardous waste facilities.	**Air**: The Plan's increased focus on waste reduction could increase localized odors from backyard composting, and the proposed variable can yard waste rate could result in some illegal dumping, which would also generate localized odor problems. Increased on-site management of organics would decrease the demand placed on centralized yard waste composting facilities relative to No Action, and food waste composting, if implemented, would reduce the amount of odor-producing material transported to and disposed of in the Columbia Ridge Landfill. However, a food waste composting facility would also have the potential to generate off-site odors, especially if all food wastes are handled. Development of a recycle center or a private station and implementing yard waste transfer at SRDS would reduce traffic and air emissions at NRDS but increase emissions at SRDS, which is located farther from residences. Air emissions from new recyclables processing facilities would depend on the specific processes employed. Less frequent yard waste collection in the north end of the City would increase the potential for odors somewhat and could increase the potential for odors at centralized yard waste composting facilities. If residential food waste collection is implemented, vehicle trips along collection routes would increase, resulting in some what greater air emissions, especially since same-day collection of garbage, yard waste, and recyclables would also be implemented. Also, the potential for leaks from food waste collection trucks would be greater than for garbage because of the higher liquid content of food waste. If new collection technologies are proposed that do not require traditional transfer, some potential for odor at container staging areas would be created, and if yard waste or food waste is collected, anaerobic conditions inside of containers could aggravate odor problems at composting facilities.	**Air**: Air quality impacts from a self-haul commingled MRF at SRDS would be greater than at a recycle center because garbage would be mixed with recyclables and because heavy equipment would operate inside of the building. Grass bans could increase localized odor impacts at illegal dump sites, but would likely reduce odor from centralized composting facilities. Bi-weekly garbage collection would result in greater odor impacts at the curb and at transfer stations. Yard waste/food waste transfer at NRDS would have a greater potential for off-site impacts than No Action or the Proposed Action.	**Air**: Continue education and technical assistance programs on proper backyard composting methods and encourage backyard composters to avoid composting meat and meat products. Require bidders for residential collection contracts to describe leak prevention measures for food waste collection vehicles and consider total vehicle miles traveled and off-site queuing when evaluating collection proposals. Encourage jurisdictions to conduct vehicle inspections and enforce cleaning requirements. At SRDS, monitor off-site odor complaints and implement odor control measures if warranted. Consider using the performance specification and submittal requirements for the upcoming residential collection bidding process to encourage private composting facilities to be sited, designed and/or operated in a manner that reduces the potential for off-site odors. Possibly require new composting facilities to enclose portions of their operation and provide exhaust air treatment and, for food waste, consider disallowing certain processes. Consider requiring new recyclables processing facilities to be sited, designed, and operated in a manner that reduces air emissions if they are to qualify for economic development incentives.	**Air**: Vehicle air emissions near facilities as well as odor impacts from garbage, yard waste, and food waste transfer, processing, or disposal facilities would be unavoidable.

Table S-1 Summary of Alternatives, Impacts and Mitigation (Continued)
Seattle 1998 Integrated Solid Waste Management Plan Programmatic EIS

Alternatives/Impacts			Mitigation for the Proposed Action	SUAI
No Action	**Proposed Action**	**Alternatives to the Proposed Action**		

Alternatives/Impacts			Mitigation for the Proposed Action	SUAI
No Action	**Proposed Action**	**Alternatives to the Proposed Action**		
Noise: Curbside recyclables collection can result in intermittent noise when glass or metal items are deposited in containers, when containers are emptied into collection trucks and compacted, and from collection vehicles starting and stopping. Although short-term, these intermittent noises are typically perceived as significant by nearby residents. At transfer stations, noise is generated by vehicles, heavy equipment, and dumping materials. Noise impacts at NRDS would be greatest due to the proximity of nearby residents; however, acoustical improvements at that facility have reduced off-site impacts somewhat. Noise from centralized yard waste composting would continue to be generated by vehicles; equipment for grinding, mixing, and moving compost piles; and aeration equipment. Noise associated with disposal would include noise along rail routes and from heavy equipment at the Columbia Ridge Landfill.	**Noise**: Additional waste reduction efforts are not expected to increase noise levels. Increased recycling could increase noise at processing facilities. Proposed changes to collection frequency would reduce collection noise in the north end of the City and increase it in the south end of the City. The recommended collection of garbage, yard waste, and recyclables from a given neighborhood on a single day would concentrate noise impacts into a single day of the week. Residential food waste collection using separate vehicles, if implemented, would also increase collection noise. Reallocation of collection truck traffic among transfer stations could redistribute truck noise among the various stations . New collection technologies, if proposed, could result in noise impacts at container staging areas. The development of new facilities or construction of facility modifications would result in short-term construction noise. At SRDS, a new recycle center including C&D debris recycling, would generated impact noises and equipment noise. If activities occur in an open-sided facility, noise could travel off-site and potentially affect homes on the hill above the station to the west. If land is purchased near NRDS for recycling improvements, off-site noise impacts could also result depending on the design of the facility. New recyclables processing facilities, food waste processing facilities, or transfer facilities could also result in noise from truck traffic, heavy equipment, and material dumping.	**Noise**: Mandatory participation in recycling could shift materials from garbage collection trucks to lower capacity recyclables collection trucks, increasing vehicle noise levels somewhat. Grass bans would reduce the amount of yard waste collected, thereby reducing noise from trucks delivering yard waste to transfer stations. Noise generation at a self-haul MRF at SRDS would be greater than at a recycle center but off-site impacts may be similar because the MRF would likely be enclosed. Yard waste/food waste transfer at NRDS would increase noise due to increased truck traffic and from an extra dozer inside of the building.	**Noise**: At NRDS and SRDS, conduct training and inspections to ensure that employees wear proper hearing protection; incorporate measures to reduce noise impacts into the design of the recycle center at SRDS and design the facility to be compatible with future installation of a noise barrier on the west side of the facility; if property is ultimately purchased at NRDS for recycling, consider enclosing the facility or providing barriers to reduce off-site noise impacts. Consider requiring new recyclables processing facilities to be sited and designed to reduce off-site noise impacts if they are to qualify for economic development incentives. Consider using specification and submittal requirements for the upcoming residential collection bidding process to encourage centralized composting facilities to be sited, designed and/or operated to reduce noise impacts.	**Noise**: Even with mitigation, some noise impacts to workers and the general public at facilities, especially NRDS, would be unavoidable and could, at times, be significant.

Table S-1 Summary of Alternatives, Impacts and Mitigation (Continued)

Alternatives/Impacts			Mitigation for the Proposed Action	SUAI
No Action	**Proposed Action**	**Alternatives to the Proposed Action**		
Public and Occupational Health Risks: Backyard composting, especially for food waste, has the potential to attract pests, including rodents and insects, if improper methods are used. Operation of collection trucks and heavy equipment at facilities can create safety hazards. Facilities handling garbage, food waste, and, to a lesser degree, yard waste can attract pests. Elevated levels of bioaerosols (micro-organisms or microbial fragments entrained on dust or water droplets in the air) can occur at composting facilities, potentially resulting in health risks to workers. Yard waste compost can also contain potential contaminants such as garden chemicals and heavy metals. Occupational health risks associated with long-haul transport and landfill disposal of garbage include the potential for accidents, accidental exposure to hazardous chemicals inadvertently placed in the garbage, safety hazards from operating heavy equipment, pests, exposure to dust and airborne irritants, and the potential for exposure to landfill gas and leachate. The City's closed landfills also have the potential to generate landfill gas and leachate. Health risks at the City's household hazardous waste facilities include exposure to chemicals in the event of a spill; there is also some risk of a spill during transport of these materials. Risks of exposure to pathogens exist at facilities handling biomedical waste.	**Public and Occupational Health Risks**: A variable can rate for yard waste could increase illegal dumping, which can cause localized pest problems. Adding a self-sort recycling center at SRDS or siting new recyclables processing facilities in Seattle would create similar risks from vehicles and equipment as those currently existing at transfer and recycling stations. During construction of the new recycling center at SRDS, there would also be some potential for excavating into garbage since the SRDS site occupies portions of an old landfill site. New food waste facilities would have similar impacts to garbage transfer stations and yard waste composting facilities. Food waste composting facilities would be somewhat more attractive to pests that yard waste composting facilities.	**Public and Occupational Health Risks**: Public and occupational health generally would be similar to the Proposed Action. Risks at a self-haul MRF at SRDS would be higher than for a recycle center because garbage would be mixed in with recyclables and because there would be more heavy equipment at a MRF. Bi-weekly garbage collection could increase localized pest and odor problems at residences and at transfer stations.	**Public and Occupational Health Risks**: Continue training programs for workers at NRDS and SRDS including programs focused on waste screening, health and safety, and emergency response. Design the new recycling center at SRDS to minimize excavation in garbage. In the upcoming bidding process for residential collection and processing, require bidders to describe health and safety programs and pest control measures for compost facilities. Periodically monitor compost products for contaminants.	**Public and Occupational Health Risks**: Because of heavy equipment and the nature of solid waste, some risks at transfer, handling, processing, and disposal facilities, especially to workers, would be unavoidable.

Table S-1 Summary of Alternatives, Impacts and Mitigation (Continued)
Seattle 1998 Integrated Solid Waste Management Plan Programmatic EIS

Alternatives/Impacts			Mitigation for the Proposed Action	SUAI
No Action	**Proposed Action**	**Alternatives to the Proposed Action**		
Land Use: Continuing existing programs would not result in land use changes except at the landfill disposal site where land will continue to be converted from agricultural or rangeland into active landfill and then closed landfill cells.	**Land Use:** Overall, the Proposed Action is consistent with Seattle Comprehensive Plan goals and policies for utility service. Requirements for new multi-family construction to include space for recycling containers would, if implemented, require changes to the City's Land Use and Zoning Code. New recyclables processing facilities could be classified as recycling centers or as a type of manufacturing use depending on the specific type of operation. Recycling centers are permitted outright in Seattle in all industrial zones and in C1 and C2 commercial zones. If a new transfer station is proposed in response to the recommended	**Land Use**: Food waste transfer at NRDS could be considered an expanded use and would possibly require an administrative conditional use permit. If a self-haul MRF is also considered a recycling center use, it would be permitted outright at the SRDS site. Certain	**Land Use**: Mitigation for noise, air, and traffic would in part improve the compatibility of new facilities with adjacent uses. Additional mitigation required in land use and zoning codes would further improve compatibility with adjacent uses. Proper siting and appropriately sized buffers will be critical factors in determining the compatibility of food waste composting facilities with adjacent	**Land Use** If properly sited, designed, and operated, new facilities hold be compatible with nearby land uses. In certain, site-specific situations, adverse land use impacts could be unavoidable.

Alternatives/Impacts			Mitigation for the Proposed Action	SUAI
No Action	**Proposed Action**	**Alternatives to the Proposed Action**		
	process for rebidding residential collection contracts, these facilities would require administrative conditional use permits in Industrial General and Industrial Commercial zones; they would be prohibited in all other zones; mitigation would be required to minimize odor and airborne dust, to control traffic, and to minimize other off-site impacts. Certain changes at SRDS could be considered an expansion of an existing non-conforming use and require an administrative conditional use permit; a new recycle center would be permitted outright. New composting facilities, depending on where they are located, would have to be consistent with zoning requirements of Pierce, Snohomish, or King County. Food waste composting is specifically addressed in the Pierce County zoning code but is not defined in either the Snohomish or King County codes. Composting would probably be classified as a general manufacturing use in Seattle, and would therefore likely be permitted outright in industrial and C1/C2 commercial zones. If a collection technology that does not require traditional transfer stations, staging areas could be required in various locations throughout the City. These staging areas are not explicitly addressed in the Seattle Land Use and Zoning code.	alternatives, such as mandatory construction site recycling, could require modifications to Seattle's Land Use and Zoning Code or Building code.	land uses.	

Table S-1 Summary of Alternatives, Impacts and Mitigation (Continued)
Seattle 1998 Integrated Solid Waste Management Plan Programmatic EIS

Alternatives/Impacts			Mitigation for the Proposed Action	SUAI
No Action	**Proposed Action**	**Alternatives to the Proposed Action**		
Public Services and Utilities: Population and business growth would increase the amount of garbage, yard waste, recyclables, and moderate risk waste handled by Seattle's system over the planning period. Impacts from growth would be most noticeable at NRDS which currently experiences problems with congestion and off-site queuing. Growth would also place increased pressure on yard waste composting facilities in the Puget Sound region.	**Public Services and Utilities**: Increased waste reduction and recycling programs would partially off-set the effects of growth. The variable can rate for yard waste could lead to increased illegal dumping, in turn increasing the need for education and enforcement. Changes in residential collection service could increase demand for customer service at SPU during the transition. Implementing commingled recyclables collection throughout the City would also require changes to recyclables processing facilities and collection fleets. If separate food waste collection is implemented, special containers could be required. Changes proposed for NRDS would reduce off-site queuing and congestion at that station, but could increase congestion and eventually lead to off-site queuing at SRDS. Food waste transfer would require modifications to existing transfer buildings or new facilities and would require leak proof transfer trailers. New or expanded food waste, yard waste, or recyclables facilities would require utility hookups or lead to increased utility use. Seattle may conclude that food waste processing is not as cost-effective as disposal in the sanitary sewer. If this practice were to increase as	**Public Services and Utilities**: Mandatory participation in recycling would further reduce the impacts of growth on transfer stations but would increase the demand for recyclables facilities; new facilities would require utility service. A ban on food waste in garbage could increase the demand for food waste composting, increase the amount of material disposed of in the sanitary sewer, or lead to increased illegal dumping. A grass ban would help relieve the pressure on yard waste composting facilities, but	**Public Services and Utilities**: Actions recommended in the Plan are designed, in part, to mitigate adverse impacts to the operation of Seattle's solid waste utility. A regional work group has developed recommendations to alleviate regional capacity issues for yard waste composting including: developing agreements between haulers and a variety of composting facilities; hauling yard waste to the Columbia Ridge Landfill site for composting; expanding grasscycling promotions; and developing contingency plans. Utility service impacts at new facilities, and mitigation, will be site specific.	**Public Service and Utilities**: All facilities handling garbage, food waste, yard waste, and recyclables create some level of unavoidable demand for utilities and public services. In rural areas, where private composting facilities are more likely to be sited, sanitary sewer service and public water supply may be unavailable and on-site systems would be required. Fire fighting and emergency

Alternatives/Impacts			Mitigation for the Proposed Action	SUAI
No Action	Proposed Action	Alternatives to the Proposed Action		
	a result, it could cause operational problems at sewer pump stations or, in the long run, contribute to capacity problems at wastewater treatment facilities. If a collection system that eliminates the need for traditional transfer is proposed, staging areas for containers could require drainage to the sanitary sewer system.	could also lead to increased illegal dumping. Bi-weekly garbage collection would require modifications to Seattle-King County Health Department regulations. A self-haul MRF at SRDS would require electric power, water, and sewer service. Food waste transfer at the NRDS would require modifications to drain liquids from food waste to the sanitary sewer.		response service may also need to be supplemented with on-site capabilities.

Table S-1 Summary of Alternatives, Impacts and Mitigation (Continued)
Seattle 1998 Integrated Solid Waste Management Plan Programmatic EIS

Alternatives/Impacts			Mitigation for the Proposed Action	SUAI
No Action	Proposed Action	Alternatives to the Proposed Action		
Earth: Grasscycling, on-site composting, and yard waste composting can condition garden soil and improve drainage but have some potential for reintroducing contaminants such as garden chemicals. Minor repairs and upgrades to existing facilities, and ongoing landfilling and yard waste composting can cause erosion of exposed soils or compost stockpiles. Ongoing landfilling can also change topography and drainage patterns. Spills can cause localized contamination of soils.	**Earth**: Construction of improvements at SRDS and the possible construction of new facilities would cause land disturbance and increase the potential for erosion from disturbed areas and from stockpiles. In addition, foundation design at SRDS will have to account for differential settlement and the possible migration of landfill gas into confined spaces. Other earth impacts would be site specific and include the need to import earth materials or dispose of excavated soils off-site and, possibly, impacts to geologic sensitive areas.	**Earth**: Other alternatives generally would not cause additional earth impacts. Localized soil contamination from illegal dumping resulting from grass bans could occur. Mandatory recycling could increase demand for processing facilities resulting in new construction and short-term earth impacts. A new self-haul MRF at SRDS would require more extensive excavation than a recycle center. Food waste transfer at NRDS could require limited excavations for utility modifications.	**Earth**: Conduct location-specific geotechnical investigations to determine foundation conditions for a new recycling center at SRDS. Enforce construction contractors compliance with their approved erosion control and sedimentation plans. Use best management practices for sedimentation and erosion control at existing or new facilities. For centralized composting facilities, consider using the specification and submittal requirements of the upcoming bidding process for residential collection to encourage private facilities to employ process designs and operating procedures that reduce the potential for contaminants in compost, and that reduce the potential for waste or leachate to contaminate soils at the site. Educate waste generators to send only clean yard waste for composting. For new recyclables processing facilities, consider requiring facilities to be sited away from sensitive areas and to restore and revegetate soils if they are to qualify for economic development incentives.	**Earth**: Some level of erosion impacts during construction of new facilities or facility improvements, even with mitigation, would be unavoidable.

Table S-1 Summary of Alternatives, Impacts and Mitigation (Continued)
Seattle 1998 Integrated Solid Waste Management Plan Programmatic EIS

Alternatives/Impacts			Mitigation for the Proposed Action	SUAI
No Action	**Proposed Action**	**Alternatives to the Proposed Action**		
Water: Ongoing impacts from existing processing and transfer facilities include increased surface water runoff from impermeable surfaces, surface water contamination due to runoff contacting oils, grease, and waste; and sedimentation of streams due to runoff from disturbed areas. Ongoing impacts from centralized yard waste composting would include increased runoff from impermeable surfaces and the potential for surface water contamination by compost pile leachate. Ongoing impacts from long-haul transport and landfill disposal includes the potential for an accident, resulting in a spill and subsequent surface water contamination and erosion and sedimentation at the landfill. Landfill liners and other systems at the landfill are designed to prevent surface or groundwater contamination by landfill leachate. Limited surface water contamination could occur at the City's household hazardous waste facilities in the event of an accidental spill.	**Water**: Construction of the proposed recycle center at SRDS as well as possible construction of new private recyclables processing facilities or transfer stations could result in increased sedimentation of surface waters during construction, could require disposal of ground water pumped from excavations, and could increase runoff from impermeable surfaces. Food waste transfer could result in contamination of surface water if proper drainage to the sanitary sewer is not provided. New or expanded composting facilities could result in increased runoff from impermeable surfaces, erosion of compost piles, and possible water contamination from active composting areas or from accidental spills. If composting occurs in arid areas, large quantities of water could be required to maintain moisture content.	**Water**: mandatory recycling would increase the need for processing facilities; new construction could cause additional erosion and sedimentation impacts. Grass bans could increase illegal dumping, causing localized contamination of surface waters. Food waste transfer at NRDS could require building modifications to ensure that liquids drain to the sanitary sewer.	**Water**: Mitigation for erosion would also reduce impacts to surface water. Other mitigation include installing and maintaining oil water separators; designing food waste transfer facilities to drain to the sanitary sewer; and using leak-proof collection and transfer containers for food waste. For new composting facilities, consider using specification and submittal requirements for the residential collection contracts bidding process to help ensure that facilities are designed and operated to minimize the potential for water quality impacts. Consider requiring new private recyclables processing facilities to provide information on measures to protect water quality and water resources if they are to quality for economic development incentives.	**Water**: Although some construction impacts would be unavoidable, long-term impacts on water are not expected to be significant.
Plants and Animals: Continuation of existing programs generally would not affect plants or animals, except at the Columbia Ridge Landfill where ongoing conversion of habitat would occur as landfill cells are developed and closed.	**Plants and Animals**: Development of new facilities resulting from the Plan's recommended policies and program directions could result in loss of habitat, especially development of new compost facilities which would most likely be sited in rural areas. New facilities could range from about 10 to 40 acres. Impacts to specific habitat types or protected species would depend on site specific conditions.	**Plants and Animals**: No additional impacts would result from the alternatives.	**Plants and Animals**: Compliance with regulations to protect sensitive areas and species would help reduce impacts to plants and animals. Additional mitigation would depend on site-specific conditions.	**Plants and Animals**: Conversion of habitat due to construction of new facilities in undeveloped and ongoing landfilling areas would be unavoidable. The significance would depend on site-specific conditions.

PART 1: Alternatives Including the Proposed Action

1.1 OVERVIEW

1.1.1 SPU's Proposal for Its 1998 Solid Waste Management Plan

Seattle Public Utilities (SPU), which is responsible for the overall management of solid waste generated by citizens, businesses, and institutions in the City of Seattle, proposes that the City adopt and implement a new Solid Waste Management Plan titled *On the Path to Sustainability.* The City has recently issued a Public Review Draft of the 1998 Plan (Draft Plan). This Draft EIS reviews the environmental impacts of implementing the recommendations in the Draft Plan. Once adopted by the Seattle City Council, the Plan will set the overall, long-term direction of SPU's solid waste management efforts in the areas of waste reduction, recycling, collection, transfer, processing, and disposal.

Major issues and policies addressed in the Draft Plan include:

- What level of effort should the City put into promoting waste reduction?
- How aggressively should Seattle seek to increase its recycling rate?
- What approach should be used for managing yard waste?
- What approach should be used for maximizing the efficiency and equity of collection and transfer?
- What role should the City's Recycling and Disposal Stations play in the future?
- What level of effort should the City put into market development, producer responsibility, and sustainable building?
- What level of effort should the City put into improving its own solid waste practices?
- How can the City best ensure that it is responsive to the needs of all its diverse customers and of its neighborhoods?

1.1.2 Programmatic Goals and Objectives

The recommended policies and program directions in the Draft Plan reflect the City's overall goal of promoting sustainability as well as SPU's fundamental goals or values, for solid waste management: protecting public and environmental health, improving cost effectiveness and system efficiency, and responding to customer and community needs. The Draft Plan also proposes seven specific goals for the City's solid waste system and programs. Goals that could ultimately lead to programs or facilities with the potential to create adverse environmental impacts are:

- To increase waste reduction and resource conservation.
- To maintain our current recycling success and expand cost-effective recycling opportunities.

- To increase the efficiency, fairness, convenience, and accessibility of services.
- To expand local markets and increase purchases of recycled-content products.
- To increase producer and consumer responsibility for sustainable waste management practices.
- To improve sustainable waste management and resource conservation practices in all City operations.

1.1.3 Seattle's Last Solid Waste Management Plan *On the Road to Recovery*

The recommendations in the Draft Planbuild on the recommendations in the City's 1989 Plan, *On the Road to Recovery*. The 1989 Plan substantially changed the focus of Seattle's solid waste management away from disposal to recycling. Between 1988 and 1995, Seattle's recycling rate increased from 28 percent of its waste to 44 percent. Seattle brought about this change by providing curbside collection of recyclables and yard waste for Seattle's residents, banning yard waste from garbage collected at the curb, providing self-haul recyclables and yard waste collection at transfer stations, establishing rate structures that encourage recycling, and initiating a variety of education and technical assistance programs. Guided by the 1989 Plan, Seattle entered into a long-term contract to transport and dispose of its remaining waste in an arid-region landfill built with liners and other systems to help prevent environmental contamination.

1.1.4 Regulations Affecting Solid Waste Management and Facility Siting

A number of Federal, State, and local regulations and guidelines influence solid waste management decisions and are designed to reduce the environmental impacts of solid waste facilities. For example, the1989 Waste Not Washington Act and Department of Ecology Guidelines require that local governments incorporate waste reduction and recycling into their solid waste management plans. Washington State law also establishes waste reduction as the highest priority management strategy, followed by recycling, with incineration or landfilling as the lowest priority.

Regulations adopted under Subtitle D of the Federal Resource Conservation and Recovery Act (RCRA) establish minimum national standards for the siting and design of non-hazardous solid waste landfills (40 CFR 258). These regulations restrict landfills from being built in unsuitable areas and require composite liners, leachate collection systems, and long-term environmental monitoring. Washington and Oregon regulations are similar and meet or exceed the national minimum criteria.

State Minimum Functional Standards for Solid Waste Management (WAC 173-304) establish requirements for siting, design, operation, closure, and post-closure of various facilities including on-site containerized storage; recycling facilities; non-contained compost piles; transfer stations; drop boxes; and inert waste, demolition waste, and wood waste landfills. The requirements establish minimum buffer requirements; surface water management standards; odor, dust, and vector controls; and other measures to reduce environmental impacts from solid waste facilities. The Minimum Functional Standards also establish technical requirements for the collection and transport of solid waste such as a maintaining containers and vehicles to minimize leakage and litter.

Composting facilities and many other solid waste management facilities are also subject to State regulations related to water quality (WAC 173-216, WAC 173-220, and WAC 173-240) and air quality (including emissions and odors; WAC 173-400 and jurisdictional air pollution control

agencies), as well as local ordinances including zoning and noise standards. The State's Interim Guidelines for Compost Quality describe recommended product testing frequencies which vary depending on the type of materials composted (such as yard waste, food waste, biosolids, and other solid wastes). Compost which is produced from biosolids (sewage sludge) is also subject to the State's Biosolids Management standards (WAC 173-308).

Compliance with many State requirements is enforced by local health departments through permit and inspection programs. Facilities and collection vehicles operating in Seattle or King County must obtain solid waste operating permits from the Seattle-King County Health Department, which also inspects facilities and can take enforcement action.

Other Federal, State, and local requirements, such as zoning, noise ordinances, air quality standards, and permit requirements for surface water and wetlands, can indirectly affect solid waste facility siting, design, and operation. Regulations that are focused on the protection of a specific element of the environment are described in this EIS under Part 2, *Affected Environment.*

1.2 ALTERNATIVES INCLUDING THE PROPOSED ACTION

This section describes alternatives considered in the Plan and evaluated in the EIS. Specifically, this section describes the policies and programs that Seattle currently has in place (the No Action Alternative); the policies and program directions recommended in the Draft Plan for waste reduction, recycling, collection, transfer, processing, disposal, and special waste (the Proposed Action); and various alternatives that SPU considered when drafting the Plan.

1.2.1 No Action Alternative

The No Action Alternative is evaluated in this EIS as a baseline to which the recommended programs, policies, and activities can be compared and to satisfy the requirements for environmental review under State SEPA rules and Seattle's SEPA ordinance (SMC 25.05). For this EIS, the No Action Alternative is defined as continuing current programs and services developed under the guidance of the City's 1989 Plan. Seattle provides some of these services directly and some through contracts with private companies. Certain services are also provided directly by private companies without a contractual arrangement with the City. The following discussions describe the specific programs, policies, facilities, and services that currently play a part in Seattle's solid waste management system.

Waste Reduction Programs and Activities—No Action Alternative

Under the guidance of the 1989 Plan, Seattle implemented a number of waste reduction programs, primarily focused on residential and business customers. These programs are aimed at preventing materials from entering the waste stream. Purchasing and using durable items and making double-sided copies are two examples of waste reduction practices. Specific waste reduction programs sponsored by the City include:

- ***Promotional, educational, and technical assistance programs*** such as Tame the Paper Tiger; a directory for selling and purchasing reused materials; fact sheets and information bulletins; and grants.
- ***Programs focused on organic materials*** such as Master Composter training, yard waste and food waste compost bin distribution, grasscycling promotions, discounts on mulching mowers, grants, and other outreach activities.

- ***Programs focused on keeping moderate risk waste out of garbage and yard waste*** These include education programs and operation of the City's two household hazardous waste collection facilities.

Recycling—No Action Alternative

Recycling—turning used materials into usable products—involves collecting used materials, processing them, and making new, marketable products from the processed materials. Since adoption of its 1989 Plan, Seattle has made a concerted effort to divert materials through a variety of voluntary programs and incentives. Specific City-sponsored recycling programs include:

- ***A voluntary residential curbside collection program serving single and multi-family homes.*** The City contracts with private companies tocollect newspaper, cardboard, mixed paper, tin cans, aluminum cans, glass bottles and jars, #1 and #2 plastic bottles, and ferrous metals (those containing iron). Curbside recycling is provided free of charge.
- ***A voluntary residential yard waste collection program serving single-family and multi-family homes.*** The City contracts with private companies for this optional service and customers who sign up are charged a flat rate. Collected yard waste is currently delivered to the Cedar Grove Composting Facility, located in King County, for processing. At times, because of capacity problems at Cedar Grove, some yard waste is diverted to Pacific Topsoils in Snohomish County. City residents are prohibited by City ordinance from putting yard waste in their garbage.
- ***Drop-off recycling for self-haul customers at the City's two transfer stations.*** The stations accept the same materials collected through the residential curbside programs. Clean wood, tires, appliances, used motor oil and oil filters, and vehicle batteries are also accepted at the two stations. Recycling for self-haul customers is free, except for vehicles carrying mixed loads of garbage and recyclables, yard waste, clean wood, tires, and/or appliances.
- ***Education, outreach, and technical assistance programs.*** These include programs such as publication of the *Curb Waste Times* and the Business and Industry Recycling Venture's database of recyclable and reusable materials.
- ***Rate incentives to encourage recycling*** These include variable can garbage rates so residential customers pay for collection based on the size of their garbage can and (for multi-family buildings) collection frequency, free curbside recycling collection, and reduced rates (relative to garbage) for yard waste collection.

In addition to these City programs, businesses can contract for recycling collection services directly with private companies. Buy-back centers and facilities for handling construction and demolition (C&D) debris are also available to serve business customers.

Altogether, these programs have substantially reduced the amount of waste requiring disposal. In 1995, single-family residents recycled 60 percent of their waste, multi-family and self-haul customers recycled less than 20 percent of their waste, and businesses recycled 48 percent. As a result, Seattle recycled 44 percent of its total waste in 1995. Continuation of the programs under the No Action alternative would eventually achieve a 47 percent recycling rate.

Collection and Flow of Materials—No Action Alternative

Residential Collection. The City of Seattle contracts separately for single family and multi-family residential collection of garbage, recyclables, and yard waste. Service contracts generally correspond to three geographic service zones defined by the City:

- North of the Ship Canal (North Zone)
- Between the Ship Canal and Yesler Avenue (Central Zone)
- South of Yesler Avenue (South Zone)

Figure 1 illustrates the location of these zones. Currently, residential garbage collected north of Yesler is delivered to the City's North Recycling and Disposal Station (North Station) for transfer, and residential garbage collected south of Yesler is delivered to the City's South Recycling and Disposal Station (South Station). Yard waste collected under City contracts north of Yesler is delivered to the North Station; yard waste collected south of Yesler is delivered to a private transfer facility at Third and Lander. North of the Ship Canal, residential customers segregate recyclables by material, and collected recyclables are delivered to the Recycle America facility in south Seattle. South of the Ship Canal, recyclables, except for glass, are commingled into a single container and are taken to a private facility at Third and Lander.

The City also defines the frequency of collection. For example, under the current system, recyclables and yard waste are collected more frequently in the northern area of the City than in south Seattle. Garbage is collected weekly from residences throughout the City. Recyclables are collected once a month south of the Ship Canal and every week north of the Ship Canal; in spring and summer, yard waste from single family residences is collected weekly north of Yesler and every other week south of Yesler. In winter, yard waste is collected monthly throughout the City.

Collection of Garbage, Recyclables, and Yard Waste from Businesses Currently, two private companies franchised by the Washington Utilities and Transportation Commission (WUTC) collect garbage generated by businesses at least weekly. The WUTC franchises give these companies the right to collect garbage in their franchise areas. Because they operate in a non-competitive environment, the rates they can charge customers are regulated by the WUTC. In 1996 the City decided to exercise its right under State law to contract for garbage collection services to businesses. SPU is currently negotiating commercial collection contracts with the franchised haulers and expects to execute these contracts by the end of the year.

A number of companies compete to collectrecyclables and yard waste from businesses. Seattle does not contract for those services.

Transfer and Processing—No Action Alternative

City-Owned Facilities. The City of Seattle owns and operates two transfer stations: the North Recycling and Disposal Station (North Station) and South Recycling and Disposal Station (South Station). **Figure 1** shows the locations of these two facilities. Current activities at these two stations would continue under the No Action Alternative. The following discussions describe these facilities in more detail.

- **North Recycling and Disposal Station** This facility is located on a 4.2 acre site near Wallingford and Fremont. The site is bounded by North 34th Street to the south, North 35th Street to the north, and Carr Place North to the east. The site contains access roads, a scale facility, an area for parking transfer trailers, an operations building, employee parking area, and a two-story concrete transfer building. Around the site perimeter are a fence and narrow landscaped buffer (see **Figure 2**).

  The North Station currently handles curbside-collected garbage; residential yard waste collected north of Yesler; and self-haul garbage, yard waste, and recyclables. Garbage is unloaded from vehicles directly into the waste pit. Certain bays are designated for commercial vehicles and others are designated for self-haul customers. After garbage is unloaded, it is compacted into containers suitable for rail haul. Loaded trailers are shuttled to the Seattle Intermodal Facility in south Seattle (see **Figure 1**).

Residential yard waste collected by contract haulers is unloaded into containers via two designated slots in the main floor. Full containers are hauled to the Cedar Grove Composting Facility in east King County (see **Figure 3**). At times, yard waste containers are shuttled to the South Recycling and Disposal Station rather than directly to Cedar Grove.

Self-haul recyclables are placed directly into a series of drop boxes or onto a designated area of the transfer building floor, where they are subsequently loaded into drop boxes or containers. Drop boxes and containers with recyclables are periodically transported off-site to vendors.

The North Station is open to the general public and contract haulers every day except Christmas, New Years Day, and Thanksgiving. Its hours are from 8 a.m. to 5:30 p.m. weekdays; from 8 a.m. to 7 p.m. Saturdays; and from 9 a.m. to 6 p.m. Sundays. During the winter, the North Station's weekday hours are from 8 a.m. to 5 p.m. After closing each day, waste remaining in the pit is loaded into transfer vehicles and the station is cleaned. Some waste remains on-site in sealed containers.

- **South Recycling and Disposal Station.** The South Station is located near the South Park neighborhood at 8100 Second Avenue South (see **Figure 1**). The station's 9.2-acre site is bounded by Second Avenue South to the west, South Kenyon Street to the north, and Fifth Avenue South to the east. The site includes access roads, a scale facility, an area for parking transfer trailers, an operations building, an employee parking area, a two-story concrete transfer building, and a household hazardous waste collection facility (see *Special Waste—No Action Alternative*, below). These facilities are shown in **Figure 4**. Around the perimeter are a fence and narrow landscaped buffer.

  The South Station currently handles curbside-collected garbage as well as self-haul garbage, yard waste, and recyclables. Full containers are hauled to the Cedar Grove Composting Facility in east King County.

  The South Station also operates 362 days per year, and is open the same hours as the North Station. The South Station accepts and handles materials similarly to the North Station. The household hazardous waste facility has more limited operating hours (see *Special Waste—No Action Alternative*, below).

Private Transfer and Processing Facilities Several private transfer and processing facilities currently handle waste generated within the City of Seattle. Major facilities that currently handle garbage, recyclables, yard waste, and C&D debris are shown in **Figures 1** and **3** and described below:

- **Third and Lander.** Located in south-central Seattle, this facility accepts garbage and recyclables generated by businesses, separated C&D debris, residential recyclables collected south of the Ship Canal, residential yard waste collected south of Yesler, and a small amount of commercial self-haul waste. The facility operates 24 hours Monday through Friday and from 7 a.m. to 4 p.m. on Saturday. The company that owns the Third and Lander Facility is in the process of being purchased by Allied Waste.
- **Eastmont**. This facility, located on West Marginal Way Southwest, accepts commercially collected garbage generated by businesses in Seattle and self-hauled and commercial C&D debris. The facility operates from 7 a.m. to 6 p.m. Monday through Friday and from 10 a.m. to 4 p.m. on Saturday. The Eastmont facility provides recycling of the following C&D debris: wood, concrete, old corrugated containers, metal, drywall, asphalt, and soil. Waste Management, owner of the Eastmont facility is in the process of merging with USA Waste Services, Inc.

- **Recycle America** Waste Management also owns Recycle America, a separate processing facility for recyclables, which is also located in south Seattle. The facility accepts recyclables collected from businesses throughout the City, and residential recyclables collected north of the Ship Canal.

INSERT FIGURE 1

INSERT FIGURE 2

INSERT FIGURE 3

INSERT FIGURE 4

- **Cedar Grove Composting Facility.** Cedar Grove is a large scale aerated static pile composting facility that handles yard waste, clean wood waste, pre-consumer vegetative food waste, paper, cardboard, and grain and coffee grounds.

  Cedar Grove's permit limits input to 165,000 tons per year, with limits of 13,000 to 15,000 tons per month during the peak grass season. The total of all on-site feedstocks, compost piles, screenings, and piles of finished material on site cannot exceed 200,000 cubic yards at any time. Other restrictions on primary compost piles include capacity and height.

  Approved feedstocks are sorted, ground, and blended to construct primary compost piles that target optimal conditions for carbon, nitrogen, initial moisture content, initial oxygen content, pH, porosity, and density. Primary compost piles are subject to negative aeration through subsurface aeration pipes. Primary compost piles are maintained in the primary zones for a minimum of 20 days, after which they are transferred to secondary piles, which are not subject to forced aeration, for a minimum of 30 days. Primary hours of operation are 7 a.m. to 7 p.m. Monday through Friday and 8a.m. to 6 p.m. Saturdays except that moving primary compost piles is prohibited on Saturdays.

- **Seattle Intermodal Facility.** Located at 5000 Denver Avenue South at the Union Pacific rail yard, this facility accepts enclosed containers of compacted waste generated in the City of Seattle as well as C&D debris in tarped, open-top containers. The intermodal facility is permitted to handle any commodity that can be transported by truck or rail. The facility operates 24 hours per day, 362 days per year.

Several private facilities also accept C&D debris such as wood, gypsum, and metals for recycling. The privately owned Black River Transfer Station is permitted to transfer C&D debris and to process clean wood waste for recycling. C&D debris is loaded into rail cars and transported from the Black River Transfer Station to the Roosevelt Regional Landfill in Klickitat County, Washington. In addition, a variety of smaller facilities for sorting and processing recyclables exist throughout the City.

Disposal—No Action Alternative

Seattle's Long Haul Contract. Seattle has a long-term contract with Washington Waste Systems (a subsidiary of Waste Management, Inc.) for long-haul transport and landfill disposal of residential garbage generated in Seattle. The contract is in effect until 2018 unless the City chooses to terminate consistent with the terms of the contract. Currently, Seattle's garbage is disposed of at the Columbia Ridge Landfill and Recycling Center near Arlington, Oregon. The Columbia Ridge Landfill occupies portions of a 2,000-acre site located 140 miles east of Portland and 200 miles southeast of Seattle. This area has an arid climate which reduces the potential for groundwater contamination from the landfill.

Closed Landfills. Seattle also monitors two closed landfills at Midway and Kent. These landfills opened in the mid-1960s and closed in the mid-1980s. Seattle is obligated to monitor these landfills for a minimum of 30 years. Prior to landfilling at the Kent and Midway landfills, Seattle disposed of waste at the Interbay, Genesee, Haller Lake, South Park, Mountlake/Ravenna, and Green Lake landfills.

Special Waste Management - No Action Alternative

Special wastes are solid wastes requiring special handling, processing, or disposal. Currently these materials are handled as described below:

- **Household Hazardous Waste.** Household hazardous waste includes materials such as used motor oil, antifreeze, fuel, solvents, paint, pesticides, herbicides, batteries, and

cleaning products. Seattle operates two household hazardous waste facilities: one at the South Station and another near Aurora Avenue North and 128th Street. The Aurora facility accepts material on an appointment-only basis. In addition, Seattle's transfer stations both accept used motor oil, oil filters, and vehicle batteries for recycling. Local auto parts stores and gas stations also take back some of this material.

- **Biomedical Wastes.** These wastes have the potential to spread infection and are regulated by the State and King County health codes. Under Seattle City Ordinance 114500, biomedical waste from medical, dental, and veterinary offices and hospitals must be transported by an infectious waste hauler permitted by the Seattle-King County Health Department. No infectious waste (except for properly contained needles and sharps, ash, and steam-sterilized waste) is accepted by the City for disposal.

1.2.2 Proposed Action

The Proposed Action, which consists of adopting the policies, programs, and services recommended in the Draft Plan,is consistent with the City's solid waste management goals or values: protecting public and environmental health, improving cost effectiveness and system efficiency, and responding to customer and community needs. The Proposed Action would eventually increase the City's recycling rate to between 50 percent and 60 percent, depending primarily on whether food waste composting is implemented.

Specific policies and programs included in the Proposed Action are described in more detail below. Certain program directions recommended in the Draft Plan that are unlikely to result in adverse environmental impacts, such as increased community partnerships, neighborhood outreach, and graffiti programs are not evaluated in this EIS. In addition, plan alternatives that the City considered but concluded were technically infeasible in Seattle, such as weight-based garbage rates, are not evaluated in this EIS.

Waste Reduction—Proposed Action

Recommended Policy Directions The Draft Plan recommends that the City more aggressively promote and encourage waste reduction and its long-term benefits. The Draft Plan recommends that the City broaden its focus to include waste reduction by producers as well as consumers.

Program Recommendations The Draft Plan recommends that the City continue and expand its waste reduction programs, including a greater emphasis on programs that would reduce the amount of residential yard waste collected. Specific program recommendations, summarized in **Table 1**, are focused on: reducing the amount of recyclable paper in garbage, encouraging on-site management of yard waste, and making waste reduction an integral part of the City's overall efforts to encourage conservation. To further encourage on-site management of yard waste, the Draft Plan recommends that the City institute a volume-based variable-can rate for yard waste.

The Draft Plan also calls for the City to expend additional effort on market development, producer responsibility, and sustainable building to meet both waste reduction and recycling goals. In the area of waste reduction, such activities could include providing incentives for manufacturers to reduce packaging, working to promote national packaging legislation, and using salvaged materials in construction. The Draft Plan specifically calls for the City to implement the Sustainable Building Action Plan that addresses items such as best management practices, code revisions to eliminate barriers to sustainable building, expedited permitting, outreach, and technical assistance

Recycling—Proposed Action

Recommended Policy Directions. The Draft Plan recommends three overall policy directions to guide the City's future recycling activities. First, the Draft Plan recommends that Seattle "continuously improve" its curbside collection and transfer station recycling programs. Second, the Draft Plan recommends implementing recycling programs in a manner that maintains and enhances Seattle's waste reduction efforts; that is, the City's efforts to expand recycling should not create disincentives to reduce waste. Finally, the Draft Plan recommends increased efforts to expand product stewardship and sustainable building practices.

Program Recommendations. The Draft Plan includes specific program recommendations in three general areas: (1) organic materials recycling; (2) recycling programs for non-organic materials, including self-haul recycling at SPU's transfer stations; and (3) expanded City involvement in developing markets for recyclable materials. Recommended program directions are summarized in **Table 2** and described below.

Organic Materials. For organic materials, the Draft Plan includes separate recommendations for yard waste and food waste. Specifically, the Draft Plan recommends that Seattle continue its ban on yard waste in the garbage and its residential curbside yard waste collection program while implementing waste reduction programs, including rate incentives, that will reduce the amount of grass and the total amount of yard waste collected. The Plan also recommends that Seattle provide technical assistance incentives for the private sector to develop a new facility to convert food waste into soil amendments or other useful products. The new food waste facility could serve business and, possibly, residential customers. (Possible processing technologies that could be used are summarized in *Transfer and Processing*, below.)

Non-Organic Materials. For non-organic materials**,** the Draft Plan recommends a series of efforts including:

- **Continued Variable Can Garbage Rates.** To encourage residential recycling, the Plan recommends that the City continue its variable can garbage rate.
- **Expanded Multi-Family Participation.** SPU estimates that about 46 percent of multi-family buildings offer recycling service while 90 percent of single-family households participate. To encourage greater multi-family participation, the Draft Plan recommends that the City adopt a two-tiered multi-family garbage rate: a lower rate for multi-family customers that provide recycling services, and a higher rate for those that do not. In addition, the City would attempt to address the issue of lack of space, through measures such as building code revisions to require that new construction contain space for recycling. In-unit containers to increase convenience for tenants are also proposed.
- **Expanded Business Participation**. The Draft Plan recommends adding small businesses to the City's residential curbside collection program with no separate charge for recycling. The Draft Plan also recommends considering changing commercial garbage rates as an increased incentive for businesses to recycle.
- **Adding New Materials**. The Draft Plan also recommends continuing to add materials to the City's residential curbside collection program based on market conditions and customer demand. Considering these factors, new materials most likely to be added next include other plastics and poly-coated paper.
- **Improving Self-Haul Recycling and Construction and Demolition Debris Recycling at the South Recycling and Disposal Station.** To help reduce self-haul traffic, the Draft Plan recommends reducing the garbage rate for curbside pick up of bulky items.To collect additional material from the self-haul waste stream and to increase recycling of C&D debris, the Draft Plan recommends adding a self-sort drop-off recycling center for business and residential self-haul customers at the South Station. The new center would be designed to

handle traditional recyclables as well as separated C&D debris.**Figure 4** shows the expected location for the new self-haul recycling center. To encourage more self-haul customers to use the new recycling center, the Draft Plan also recommends charging self-haul customers lower rates for garbage disposal at the South Station than at the North Station. The Draft Plan also recommends that the City consider purchasing property adjacent to the North Station in order to enhance drop-off recycling opportunities at that location.

The Draft Plan also recommends expanded education of construction contractors, businesses, building owners and tenants, and other City agencies.

Market Development, Product Development, and Sustainable Building. To increase local processing of recyclables, the Draft Plan recommends a major increase in market development programs by the City. Recommended programs include expanded outreach, technical assistance, and product performance testing by the City. In addition, the Draft Plan recommends that the City create economic development incentives to encourage recyclables processing and manufacturing facilities to locate within the City of Seattle. Product stewardship recommendations include incentives for producers to take back items. The Draft Plan also recommends use of recycled materials in construction and other measures to promote sustainable building.

Collection and Waste Flow—Proposed Action

Recommended Policy Directions The Draft Plan recommends that Seattle strive to improve the efficiency and equity of waste collection when it rebids residential collection contracts.

Program Recommendations

The Draft Plan recommends an approach that, within certain performance requirements, maximizes the flexibility of the private sector to suggest methods to improve collection efficiency. Draft Plan recommendations directly or indirectly address: how often materials are collected (collection frequency), containers for curbside collection, the type of vehicles used for collection, how materials flow to public and private transfer stations or processing facilities, and processing. (see **Table 3)**

- **Collection Frequency.** Unlike current practice where residential collection frequencies vary, the Draft Plan recommends that the City establish uniform citywide residential collection frequencies for garbage, recyclables, and yard waste. Specifically, the Draft Plan recommends weekly garbage collection; every other week recyclables collection; monthly yard waste collection in the winter, and every other week yard waste collection in the spring, summer, and fall. The Draft Plan also recommends same-day collection of garbage, recyclables, and yard waste in a given neighborhood.
- **Curbside Recyclables Collection Containers.** Currently residents north of the Ship Canal who participate in Seattle's curbside recycling program segregate recyclables by material type. Residents located south of the Ship Canal separate glass, but commingle other recyclables into a single bin. The Draft Plan recommends that bidders provide prices for providing this type of commingled recyclables collection service north of the Ship Canal as well.
- **Vehicle Types and Material Flow.** Other than excluding curbside collected yard waste or food waste transfer at the North Station,the Draft Plan does not recommend that the City request specific types of collection vehicles or designate specific processing or transfer stations when it rebids its residential collection contracts. Instead, the Draft Plan recommends that the City ask bidders to propose prices for continuing current operations

and to provide prices incorporating their suggested system improvements, such as which combination of public

and private facilities they would use for garbage, yard waste, and recyclables transfer and how they would deliver garbage by rail to Seattle's contracted location for landfill disposal.

- **Residential Food Waste Collection and Processing** Preliminary results from studies being conducted by SPU indicate that composting residential food waste may not be as cost-effective as disposing of this material into the sewer or composting on-site (Gibson, 1998). However, these results are not based on prices obtained through a competitive bidding process. Therefore, the Draft Planrecommends that the City obtain proposals for residential food waste collection and yard waste/vegetative food waste co-collection, both with and without processing. Specifically, the Draft Plan recommends that the City obtain prices for all food waste and for yard waste/vegetative food waste collection and processing. Depending on the results of the bidding process, SPU could then elect to implement residential food waste collection as part of its curbside program.

The Draft Plan's recommended approach to rebidding residential collection contracts could shift the types and quantities of materials among existing stations or could lead to the development of new facilities as described under*Transfer and Processing*, below. Another possible outcome would be for a potential bidder to propose a new collection technology and/or new transfer facility. New collection technologies could include, for example, systems that eliminate the need for large transfer stations and instead substitute collection vehicles with detachable, sealed containers that could be temporarily stored and loaded onto larger vehicles at a parking lot or smaller staging area for transport to the rail head.

Transfer and Processing—Proposed Action

The Draft Plan proposes limited changes to the City's transfer stations beyond those associated with increasing recycling opportunities at the South Station and banning curbside-collected yard waste and food waste at the North Station. However, the Draft Plan's proposed recycling and collection program directions could result in the development of new private transfer and processing facilities for food waste, yard waste, and recyclables. The Draft Plan's proposed process for rebidding collection contracts could also lead to a bidder proposing: a new specialized transfer station to serve the City (i.e., for food waste); food waste transfer at existing private stations, or possibly at the City's South Station; or use of transfer stations outside of Seattle. The types of facilities or modifications to existing facilities that could result from the Draft Plan's recommendations are described below.

- ***Food Waste Transfer.*** Food waste transfer, at new or existing private stations or possibly at the City's South Station, could be included in proposals for food waste collection. SPU recently conducted a study of food waste transfer, which concluded that facility requirements would include a tipping floor, receiving floor, area for draining excess liquid, and an area for loading trailers. This would require an additional 8,000 to 10,000 square feet within an existing transfer building. Alternatively, a new food waste transfer station, similar to transfer stations receiving garbage, could be proposed. Such a facility would likely include scales, on-site parking areas for cars and transfer trucks, and an enclosed transfer building.

- ***New Food Waste Processing Facility (All Food Waste).*** For food waste, a composting process is probably the most likely technology to be proposed. Food waste composting facilities transform food waste and compostable paper into a useful soil amendment using aerobic (with oxygen) decomposition by micro-organisms such as bacteria and fungi. Most facilities in the United States and Europe that accept all food waste (meat and fat as well as vegetative food waste) use turned windrow, aerated static piles, turned aerated static piles, or in-vessel processes to maintain optimum moisture, oxygen, and temperature to promote rapid decomposition.

Alternatively, an anaerobic digestion process could be proposed**.** Anaerobic digestion facilities convert waste into biogas (methane, carbon dioxide, and hydrogen sulfide) and solids using anaerobic (without oxygen) micro-organisms. Widely used in the treatment of wastewater sludges, anaerobic digestion has had very limited application to food wastes in the United States. However, by the early to mid-1990's, this technology was being used more frequently for food wastes in Europe. In such a facility, food wastes would be ground or crushed into a slurry, pumped into tanks and fermented, pumped into sealed tanks without oxygen and allowed to completely decompose into biogas and sludge. The sludge then would be dewatered, screened, and used as a soil amendment.

Another possibility would be a facility to convert food waste into animal feed. However, only one known animal feed conversion facility is currently operating in North America (E&A, 1998). Like an anaerobic digestion facility, an animal feed conversion facility would typically process and ferment a slurry of food waste. Rather than further decomposing the material, however, the fermented food waste would be dewatered, dried, and formed into feed pellets.

- ***Yard Waste/Vegetative Food Waste Composting*** The Draft Plan also recommends obtaining prices for vegetative food waste/yard waste co-collection and composting. This could entail modifications to existing private sector yard waste facilities or could lead to development of a new facility.

Expanded Use of Yard Waste Composting Capacity. Under the recommended process for rebidding its residential collection contracts, it is possible that facilities other than Cedar Grove could be proposed or that a range of facilities could be proposed. Possible facilities are located in Snohomish, King, and Pierce counties and at the Columbia Ridge Landfill site in Oregon, where Seattle's garbage is transported for disposal. **Table 4** summarizes characteristics of these facilities. In addition, it is possible that a new yard waste composting facility or new processes, such as land application of minimally processed yard waste, could be proposed. In this type of process, yard waste is composted for a short time to destroy weed seeds and plant pathogens and then is screened to remove large woody material. This waste utilization method has been practiced for several years on a large scale in agricultural areas near San Francisco. Locally, Land Recovery, Inc. (LRI) has utilized this process as a means of handling peak yard waste loading during the spring and early summer. King County is planning a demonstration program in 1998.

Disposal—Proposed Action

The Draft Plan recommends that Seattle continue its current practice of disposing of its remaining garbage in an arid region landfill. Thus, the Proposed Action for disposal is essentially the same as the No Action Alternative.

Special Waste—Proposed Action

The Draft Plan recommends continuing current practices for special waste.

1.2.3 Alternatives to the Proposed Action

The Draft Plan also identifies several alternatives for accomplishing the goals identified in the Plan. Generally, the Draft Plan recommends education and outreach, rate incentives, and new facilities or facility improvements to achieve its waste reduction and recycling goals. Alternatives include banning additional materials from garbage or yard waste and mandating various levels of participation in recycling programs. These and other alternatives considered in

the Draft Plan are described below. Where potential environmental impacts are similar, this EIS groups Plan alternatives together. The Draft Plan does not consider other

alternatives for disposal or special waste. Adding these alternatives to the Proposed Action (and including food waste processing) would result in a 60 to 70 percent recycling rate.

Other Waste Reduction Alternatives

Other waste reduction alternatives considered in developing the Draft Plan recommendations include:

- ***Variable Can Recycling Rates.*** Currently, residential recycling is offered free of charge, which creates an incentive to recycle but can also be a disincentive to reduce waste. This alternative would charge customers for recycling with the charge increasing as the amount of material recycled increased, thereby creating an economic incentive to reduce waste. The variable can recycling rate would be designed to be less than the variable rate for garbage, thereby also retaining the incentive to recycle.
- ***Grass Ban or Increased Grass Rates.*** This alternative would ban grass from curbside collected yard waste and from self-haulers at the City's transfer stations or would increase collection rates for grass, thereby encouraging on-site management through grasscycling or on-site composting.

Other Recycling Alternatives

Other recycling alternatives considered in developing the Draft Plan recommendations include:

- ***Mandatory Participation.*** Currently and as proposed in the Draft Plan, participation in single family, multi-family, and business recycling programs is voluntary. This alternative would require multi-family or business customers to sign up for recycling service.
- ***Bans.*** Currently, Seattle bans yard waste from garbage. This alternative would ban additional materials, such as clean paper and cardboard, and at the extreme could involve banning all non-organic recyclables from garbage.
- ***Mandatory Take-Backs.*** This alternative would require that product manufacturers, wholesale companies, and/or retail companies take back certain materials for re-manufacture or reuse.
- ***Mandatory Food Waste Separation by Businesses and/or Residences.*** This alternative would be coupled with development of a food waste composting facility and with collection programs for food waste generated by businesses or residences.
- ***Collection of Additional Materials.*** Under this alternative, SPU would add additional materials to its curbside collection programs that do not appear to be cost-effective, such as polystyrene and plastic film, in order to reduce the amount of garbage requiring disposal.

Other Collection, Flow, and Processing Alternatives

The Draft Plan recommends a process for rebidding residential collection contracts and for multi-family and small business collection that could lead to a range of outcomes, which are evaluated as part of the Proposed Action in Part 2 of this EIS. This range of outcomes covers many of the collection and flow alternatives considered in the Draft Plan. These alternatives include:

- ***Every-Other-Week Garbage Collection/Weekly Food Waste Collection.*** This alternative would reduce the frequency of garbage collection from weekly to every other week, but would be coupled with weekly food waste collection.
- ***Commingled or Co-Collection.*** This alternative would involve collecting more than one material in a single truck, either mixed together (commingled) or in a truck with up to four separate compartments (co-collection). Although they are not prohibited, these collection

options are unlikely to result from the recommended collection contract bidding process because of the collection frequency requirements recommended in the Draft Plan. (Commingled collection of yard waste and vegetative food waste is evaluated as part of the Proposed Action.)

- ***Commingled Self-Haul Material Recovery Facility at the South Recycling and Disposal Station.*** This alternative would be a material recovery facility where commingled self-haul garbage and recyclables are delivered to a separate, fully enclosed building on the South Station site for processing. Processing would likely include separation of recyclable materials from garbage and segregation of recyclables by material type using a conveyor and pickline.
- ***Food Waste and/or Yard Waste Transfer at the City's North Station*** This alternative would include the transfer of curbside-collected yard waste and/or food waste at the North Station.

1.3 SCOPING AND SEPA PROCESS

1.3.1 Scoping Summary

As lead agency, SPU conducted an expanded scoping process for this EIS. On March 5, 1998, SPU issued a scoping notice requesting public comment on the alternatives and areas of the environment to be addressed in the EIS. The scoping notice was mailed to a list of potentially interested tribes, agencies, and individuals and requested comments by March 26, 1998. Legal notices were published as required by Seattle's SEPA ordinance.

Two public scoping meetings were held: one on March 17, 1998 at Hamilton Middle School in Wallingford and the second on March 18, 1998 at the South Park Community Center. No one wishing to make comments attended either meeting.

SPU received two written scoping comments on the EIS. Issues raised in one comment letter included:

- The EIS should be easy to read
- The EIS should address neighborhood concerns such as noise, dust, odor, traffic, fumes, site lighting, and landscaping
- Collection efficiency should not come at the expense of additional neighborhood impacts such as fumes, noise, and dust.

The second letter from the City of Shoreline requested that the EIS provide an impact evaluation of sending a portion of curbside collected garbage in North Seattle to King County's First Northeast Transfer Station, which is located in Shoreline. This comment was received in response to Seattle's request for comments from Shoreline on an earlier internal draft of the Plan; although the Draft Plan does not specifically identify this action as an alternative, impacts resulting from such a change, should it be proposed by a private hauler, are discussed in **Section 2.7.3, *Public Services and Utilities*.**

1.3.2 Phased Environmental Review

Adoption of the *1998 Solid Waste Management Plan* is a non-project or programmatic action. When final, the programmatic EIS on the 1998 Plan will be part of a phased environmental review under the City of Seattle's SEPA ordinance (SMC 25.05.060E). Should the program directions recommended in the Draft Plan lead to the development of new facilities, siting and construction of those facilities could also be subject to project-specific environmental review.

Modifications to existing facilities could also be subject to project-specific environmental review depending on the nature of the modifications. The need for additional project-specific environmental review will be determined on a case-by-case basis.

1.3.3 Incorporation by Reference

Adoption of the Draft Plan recommendations could potentially affect a number of existing facilities. To the extent applicable, Part 2 of this EIS incorporates portions of analysis from the following environmental document:

- *Seattle Waste Transport and Disposal Project. Final Environmental Impact Statement* Seattle Solid Waste Utility. July, 1990

1.3.4 Expected Schedule and Final Action on the Proposal

After receiving comments on the Draft Plan and on the Draft EIS, SPU will make revisions to the Plan and issue a final EIS. The Plan will then be adopted, possibly with further revisions, by the City Council. Adoption is expected prior to September, 1998 but cannot occur until at least seven days after issuance of the Final EIS.

1.4 EFFECTS OF DEFERRING THE PROPOSED ACTION

A delay in adopting the 1998 Plan would essentially result in Seattle continuing its current practices for managing solid waste. Without adoption of the Plan, Seattle would not be able to take advantage of the full range of opportunities for innovation and efficiency when it rebids its collection contracts. In addition, further progress toward waste reduction and recycling would be deferred, thereby increasing the potential adverse environmental impacts from disposal. To the extent that deferring the Proposed Action also defers development of modifications to existing facilities or to the development of new, privately-owned facilities, environmental impacts associated with the development of those facilities would also be deferred.

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PART 2: Affected Environment, Significant Impacts, and Mitigation Measures

2.1 INTRODUCTION

2.1.1 Organization

This part of the EIS describes the affected environment, significant impacts of the Proposed Action and alternatives, and mitigation measures that could be employed to avoid, reduce, or compensate for adverse impacts. This part is organized by element of the environment with separate sections for each element. For example, the section on Land Use includes a description of the affected land use environment, analyses of impacts, and a discussion of mitigation. Each section ends with an evaluation of significant unavoidable adverse impacts—impacts that would remain even after mitigation. The order of sections is:

- Transportation
- Air
- Noise
- Public and Occupational Health Risks
- Land Use
- Public Service and Utilities
- Earth
- Water
- Plants and Animals

In each section, the No Action Alternative is evaluated first, followed by an evaluation of additional impacts that could result from the Proposed Action or alternatives.

2.1.2 Geographic Extent of the Affected Environment

The affected environment for the Proposed Action includes:

- The City of Seattle.
- Specific locations within the City where facilities that transfer or process garbage, yard waste, or food waste are located.

- Other facilities where Seattle contracts for services, such as the Cedar Grove Compost Facility and the Columbia Ridge Landfill.
- Areas where facilities could be sited in response to recommended actions in the Plan.

In general, these areas include the City of Seattle; King, Pierce, and Snohomish counties; transportation routes; and the area surrounding the Columbia Ridge Landfill in eastern Oregon.

2.1.3 Mitigation

Mitigation includes all actions to avoid, minimize, or compensate for adverse impacts. In many cases, impacts can be adequately mitigated through compliance with regulations. For example, mitigation could also derive from the various regulatory review processes which govern the development and operation of such facilities. These regulatory processes could include building codes, land use codes, grading and drainage codes, noise codes, and others. In other cases, additional mitigation may be required. Both types of mitigation are identified in this EIS.

Many of the actions that could result from adoption and implementation of the Plan would involve the private sector. For example, the Draft Plan's recommendations could lead to the development of new private facilities for processing food waste. Where private sector actions could lead to adverse environmental impacts, mitigation would not be directly implemented by the City of Seattle. However, the City can influence the type and level of mitigation implemented through its contracting practices. This type of action is also identified, where applicable, in the mitigation discussions contained in the following sections of this EIS.

2.2 TRANSPORTATION

2.2.1 Affected Environment

Overview

Traffic impacts associated with Seattle's solid waste management system are greatest in the vicinity of transfer and processing facilities where waste is delivered by collection vehicles or self-haulers. Traffic is also generated at landfill disposal site(s) and in neighborhoods where waste is collected. Traffic impacts potentially include increases in traffic volumes, congestion along routes and at intersections, queuing and access problems, and safety issues such as conflicts with pedestrians or inadequate sight distances. The following discussion focuses on access, traffic volumes, and potential safety issues at major facilities currently handling Seattle's garbage, yard waste, and recyclables.

Table 5 summarizes 1995 trip generation at major facilities resulting from solid waste (garbage, yard waste, and recyclables) generated in Seattle. During that year, these facilities generated about 963,000 annual trips, excluding employee traffic. (Each vehicle arriving and departing from a facility generates two trips.) About 60 percent of the total are associated with self-haul vehicles; 30 percent are garbage, yard waste, and recyclables collection trucks, and ten percent are large tractor-trailer transfer trucks.

City-Owned Facilities

North Recycling and Disposal Station

Location and Access. The North Station is located on the north side of Lake Union near the Fremont and Wallingford neighborhoods. Garbage and yard waste collection trucks and self-haul vehicles enter and exit the North Station site from North 34th Street. Transfer trucks (trucks that haul larger amounts of compacted garbage or yard waste away from the station) enter and exit the site off North 35th Street between Stone Way North and Interlake Avenue North.

The top drawing in **Figure 5** shows the origin and distribution of traffic approaching the North Station. Arterial streets providing access to the transfer station include North 34th Street, North 35th Street, Stone Way North, and Wallingford Avenue North. In the vicinity of the North Station, Wallingford Avenue North and North 35th Street are two-lane streets with parking along both sides. Stone Way is a four-lane street with parking along both sides. North 34th Street is a two-lane street with a long center left-turn lane which can be used by traffic arriving at the station from the west. All other streets in the site vicinity, including North 35th Street, are residential streets.

TABLE 5 - SUMMARY OF SEATTLE WASTE HAULING TRAFFIC BY FACILITY, 1995

Facility	Annual Trips[1] by Vehicle Type				
	Self-haul[2]	Collection Trucks	Tractor-trailers	Total	Employees
North Station	337,000	39,000	15,000	391,000	10,900
South Station[3]	216,000	15,000	9,200	240,200	19,400
Aurora HHW Facility	10,400	--	20	10,400	1,200
Eastmont[4]	--	36,000	7,800	43,800	13,700

Recycle America [4]	--	40,000	7,200	47,200	11,700
Third and Lander [4]	2,500	152,000	57,300	211,800	59,300
Black River [4]	--	11,000	--	11,000	unknown
Seattle Intermodal [4]	--	--	38,000	38,000	unknown
Cedar Grove Compost [4]	--	--	7,100	7,100	unknown
Totals [4]	566,000	293,000	104,000	963,000	

Source: Seattle Public Utilities

1. Each vehicle counts for two trips: one arriving and one departing.
2. Self-haul is generally cars and pickup trucks.
3. South Station Traffic includes traffic generated by the HHW facility.
4. Includes only trips hauling Seattle's waste. Other trips are generated at these facilities from non-Seattle materials. Employees given for these facilities include all employees.

Because there is only one incoming scale at the North Station, the facility has an intake capacity of about 80 vehicles per hour. Because the scale is located about 150 feet from the site entrance, off-site queues can develop, especially on weekends when self-haul traffic peaks. To help reduce the impacts of off-site queuing and other ingress/egress conflicts at the station entrance, signs direct vehicles approaching from the north and west in a clockwise circulation pattern from Stone Way North via North 35th Street, then south on Wallingford Avenue North and finally west on North 34th Street.

Trip Generation and Vicinity Traffic Volumes. The lower portion of **Figure 5** shows average weekday traffic counts on the street system in the vicinity of the North Station in 1995. On weekdays, total traffic counts on North 34th Street in the immediate vicinity of the North Station averaged 15,800 trips while traffic counts on Stone Way North averaged 11,500 trips. These trips include traffic generated by the North Station as well as traffic generated by residents and other businesses and activities in the area.

Traffic associated with the station itself primarily includes:

- Self-haul cars and light trucks delivering garbage, yard waste, and recyclables.
- Collection trucks delivering residential garbage and yard waste collected north of Yesler Way.
- Transfer trucks taking compacted garbage to the Seattle Intermodal Facility.
- Transfer trucks taking yard waste to Cedar Grove Composting Facility.
- Trucks taking recyclables to processing centers.
- Employee vehicles.

In total, the station generated about 1190 average daily trips in 1995, not including employee trips (1190 vehicle trips are equivalent to 595 vehicles because each vehicle using the station generates two trips—one in-bound and one out-bound). About 980 of these were self-haul trips; about 150 were collection truck trips, and about 60 were transfer-trailer trips.

Overall, traffic generated by the operation of the North Station in 1995 accounted for a relatively small proportion of total weekday traffic in the general vicinity of the station. As shown in the lower drawing of **Figure 5**, on an average weekday, 550 (3.5 percent) of the 15,800 trips on North 34th Street were from the station; about 325 (2.8

percent) of the 11,500 trips on Stone Way just north of 35th Street were from the station. The highest relative impact from North Station traffic was along Wallingford Avenue North where 360 (8.2 percent) of the 4400 average weekday trips just north of North 35th Street were from the station.

Traffic generated by the North Station was dominated by self-haul vehicles, which account for about 84 percent of the station's trips. On weekend days, self-haul traffic ranged from about 1260 to 1480 daily trips. On peak weekend days and some weekdays, the vehicle approach rate often exceeds intake capacity, causing access queues on the approach routes.

Existing Safety and Congestion Issues. Sidewalks are provided on all streets bordering the North Station. Signalized intersections are located at the corners of Stone Way and North 34th Street, Stone Way and North 35th Street, and Wallingford Avenue and North 34th Street. One marked pedestrian crossing is located on North 34th Street in the vicinity of the station. The Burke-Gilman Trail, a bicycle/walking trail, runs parallel to North 34th Street on the south side. Gas Works Park is located south of the trail.

Metro transit provides public transit services along North 34th Street, North 35th Street and Stone Way North. Only North 35th Street has bus stops, which are within two blocks of the transfer station, with two stops on both the north and south side of the street.

Traffic queues from the station back onto the North 34th Street during times of peak facility use. To maneuver around the queue, west bound traffic on North 34th Street may enter the eastbound lane when passing. The traffic queue on North 34th Street can potentially interfere with pedestrians crossing North 34th Street to the south towards the Burke-Gilman Trail and Gas Works Park.

South Recycling and Disposal Station

Location and Access. The South Station is located in an industrial area north of the South Park neighborhood (see **Figure 6**). Vehicles with garbage, recyclables, yard waste, and household hazardous waste enter and exit the site from Fifth Avenue South near the southeast corner of the site. Transfer trailers use an exit at the North end of the site onto Fifth Avenue South and enter the site off of Fifth Avenue South, about 400 feet north of the customer site entrance. The site's general access and scales have an intake capacity of about 80 vehicles per hour; that capacity is rarely reached, and off-site queuing is rarely a problem at this station.

The top drawing in **Figure 6** shows the distribution of traffic generated by the South Station. The South Station is located near two major highways: State Routes 99 and 509. Arterial streets serving the immediate area around the site are South Kenyon Street, Fifth Avenue South, and South Cloverdale Street. Near the site, South Kenyon Street and Fifth Avenue South are two-lane streets without curbs, gutters, or sidewalks. Cloverdale Street is a two-lane street with center left-turn lanes at significant intersections, and parking on both sides between intersections.

Site traffic access has been in a state of flux as construction proceeds on the First Avenue South crossing of the Duwamish River. **Figure 7** gives a more detailed view of the ultimate access configuration after construction is complete.

Trip Generation and Vicinity Traffic Volumes. The lower portion of **Figure 6** shows average daily traffic counts on the street system in the vicinity of the South Station in 1995. On weekdays, total traffic counts on South Kenyon Street in the immediate vicinity of the South Station averaged 1600 trips while weekday traffic counts on Fifth Avenue South averaged 2400 trips. Traffic volumes on South Cloverdale Street to the east of Fifth Avenue South averaged 12,900 trips on weekdays. These trips include traffic generated by the South Station as well as traffic generated by housing and other businesses and activities in the area.

Traffic associated with the station itself primarily includes:

- Self-haul cars and light trucks delivering garbage, yard waste, recyclables, and household hazardous waste.
- Collection trucks delivering residential garbage from south of Yesler Way.
- Transfer trucks taking compacted garbage to the Seattle Intermodal Facility.

- Transfer trucks taking consolidated loads of self-haul yard waste to Cedar Grove Composting.
- Trucks taking recyclables to processing centers.
- Employee vehicles.

In total, the South Station generated less than 750 average daily trips in 1995. Overall, traffic generated by the operation of the South Station in 1995 accounted for a relatively small proportion of total weekday traffic in the general vicinity of the station. As shown in the lower drawing on **Figure 6**, on an average weekday, 360 (15 percent) of the 2400 trips on Fifth Avenue South were generated by the station; about 195 (12 percent) of the 1600 trips on South Kenyon Street were from the station.

As with the North Station, traffic generated by the South Station is also dominated by self-haul vehicles, which account for 83 percent of total trips. On weekends, self-haul traffic ranged from 720 to 1040 daily trips.

Existing Congestion and Safety Issues. South of the South Station, Fifth Avenue South is in poor condition and parked cars along the street make its width too narrow for trucks in opposing directions to pass one-another. The intersection of Fifth Avenue South and South Cloverdale Street has been recently signalized to improve its operation and safety. Land uses are generally residential east of Fifth Avenue South, with retail uses in the vicinity of its 14th Avenue South approach to the 16th Avenue South Duwamish River Bridge. Metro bus stops are located along Cloverdale.

Aurora Household Hazardous Waste Facility

The Aurora Household Hazardous Waste Facility is located just east of Aurora Avenue North near Haller Lake between North 125th Street and North 130th Street. The facility generated a total of 10,400 trips in 1995. Peak traffic occurs on Sundays when about 120 trips are generated. The facility accounts for about 52 of the total 1500 average daily trips on North 125th Street in the immediate vicinity of the site; its contribution to traffic on Aurora Avenue North is negligible.

Private Transfer Stations

Eastmont and Recycle America

Location and Access. Both of these privately operated facilities are located in south Seattle in the same industrial area as the South Station. Eastmont is easily accessed from West Marginal Way, a five-lane arterial. Recycle America is accessed from First Avenue South via Southwest Kenyon Street, both two-lane streets.

Figure 7 illustrates the road system in the vicinity of these two stations as it will appear upon completion of the First Avenue South bridge reconstruction. Baseline traffic volumes have been adjusted to reflect expected conditions when the bridge is finished.

Trip Generation and Vicinity Traffic Volumes. Figure 7 shows average weekday traffic counts on the street system in the vicinity of these two facilities. On weekdays, traffic counts on First Avenue South, just north of Recycle America totaled 7200 trips per day. On West Marginal Way, just south of the Eastmont Facility, weekday traffic totaled about 14,000 trips per day. These trips include traffic generated by the two facilities as well as traffic generated by other activities in the area.

Traffic at the Eastmont Facility associated with materials generated in Seattle includes:

- Collection trucks delivering garbage collected from businesses
- Construction and demolition (C&D) debris
- Transfer trucks taking consolidated garbage to the Seattle Intermodal Facility

- Contaminated soil

Traffic at Recycle America associated with materials generated in Seattle includes:

- Collection trucks delivering recyclables
- Transfer and roll-off trucks taking recyclables to manufacturers and processors

Each of these facilities also processes materials generated outside of Seattle and generates employee traffic. Altogether, these two sites generate a total of about 850 vehicle trips per day. Traffic generation is primarily trucks except for about 110 employee trips. About 44 percent of the truck trips are related to materials collected in Seattle.

Overall traffic generated by these two facilities (including traffic related to materials from Seattle and other sources) makes a relatively small contribution to total traffic volumes in their surrounding street networks, even in the immediate vicinities of the two facilities. For example, trips to and from Recycle America represent less than five percent of the trips along First Avenue South in the vicinity of the facility and trips to and from Eastmont represent less than four percent of trips along West Marginal Way Southwest.

Third and Lander

Site Access and Location. Third and Lander is the largest transfer and processing facility in Seattle. It is located west of Third Avenue South between South Lander and South Hanford Streets, as shown on **Figure 8.** All streets are heavily used by industrial traffic, with relatively high proportions of truck traffic. There are no street operational problems, such as congested intersections, in the site vicinity.

Trip Generation and Vicinity Traffic Volumes. In addition to handling over 40 percent of Seattle's garbage, yard waste, and recyclables, Third and Lander also handles a large amount of material generated outside of Seattle. Truck traffic generated at Third and Lander and associated with material generated in the City primarily includes:

- Collection trucks delivering residential yard waste, garbage from businesses, and recyclables from residences in Seattle.
- Collection trucks delivering C&D debris.
- Transfer trucks taking consolidated garbage to the Seattle Intermodal Facility.
- Transfer trucks taking consolidated yard waste to Cedar Grove Composting.
- Trucks taking recyclables to processors and manufacturers.
- Trucks delivering contaminated soils and other materials.

The site also generates trips from materials generated outside of Seattle and from employees.

Figure 8 illustrates the distribution of vehicle traffic generated by the site as well as total average weekday traffic volumes. Weekday traffic volumes on 4th Avenue South average 24,200 trips per day near the Third and Lander Facility; about 750 of those trips were generated by the facility (Seattle and non-Seattle materials). Weekday traffic volumes on South Horton Street averaged about 4300 trips per day just east of the Third and Lander Facility; about 340 of those trips (7.9 percent) were generated by the facility.

Except for employee trips, nearly all vehicles accessing the facility are large trucks; however, nearly 40 percent of the material received at Third and Lander is shipped out of the facility by rail from the adjacent Burlington Northern and Santa Fe Railroad intermodal service spur track. Materials shipped by rail from Third and Lander are destined for the Roosevelt Regional Landfill in Klickitat County Washington. Except for some contaminated soils and C&D debris, waste generated within Seattle is not delivered to that landfill. About 26 percent of the

material processed at Third and Lander is Seattle garbage that is delivered to the Columbia Ridge Landfill from the Seattle Intermodal Facility via South Horton Street and Alaskan Way South.

Other Facilities

The facilities discussed above receive garbage, yard waste, and recyclables generated in Seattle directly from the generators or from commercial haulers. After transfer and/or processing at one of these stations, materials are delivered to other facilities, either for additional processing or for disposal. These "downstream" facilities include recyclables processors and manufacturers, the Union Pacific Railroad Seattle Intermodal Facility, the Cedar Grove Composting Facility, and the Columbia Ridge Landfill. At many of these facilities, materials generated within Seattle account for a small portion of total traffic. For example, the Seattle Intermodal Facility is one part of a large Union Pacific intermodal train terminal. Similarly, the *1990 Seattle Waste Transport and Disposal Project Final Environmental Impact Statement*, which is incorporated by reference, determined that the Seattle Waste and Disposal Contract would only increase rail traffic by about one percent between Seattle and Arlington, Oregon. Seattle's yard waste accounts for about 30 percent of the traffic (about 7100 truck trips per year) at Cedar Grove Composting. Recently imposed permit conditions for issues not related to traffic should reduce the total amount of traffic at Cedar Grove Composting.

2.2.2 Impacts—No Action Alternative

System-wide Growth-Related Impacts

The No Action Alternative would continue Seattle's existing waste reduction, recycling, processing, transfer, disposal, and special waste programs. In general, continuing waste reduction, recycling, and collection programs would not have an adverse effect on transportation in neighborhoods, where they make up a very small fraction of street traffic.

As Seattle's population and business activity grows, overall traffic in the vicinity of the major facilities described under *Affected Environment* would also increase. Traffic generated by the facilities would increase as well. Depending on the population and economic forecast assumptions used, by 2014 facility-generated traffic is estimated to increase by about 14 to 26 percent, or by about 420 to 780 average daily trips system-wide. About 44 percent of the growth-related trips are self-haul; 48 percent are collection vehicles; and eight percent are transfer trucks.

Most facilities and nearby road systems are operating well below their potential capacity and should be able to readily absorb this growth, even accounting for increases in neighborhood traffic volumes. The greatest increase in traffic would be at the Third and Lander Facility where 190 to 350 vehicle trips would be added.

Increased Off-Site Queuing at the North Recycling and Disposal Station

Over the planning period, growth would aggravate existing intake capacity and queuing problems at the North Station, where the existing scale facilities are unable to accommodate more than about 80 vehicles per hour. Self-haul traffic currently exceeds this intake capacity on peak weekend afternoons, which causes backup queues on approach streets. By 2014, annual trips at the North Station are estimated to increase by about 11 percent or 120 average daily trips.

2.2.3 Additional Impacts of the Proposed Action

This section describes additional transportation impacts, compared to No Action, that could result from implementation of the Draft Plan's recommendations. Because the Proposed Action does not include any changes to disposal at those facilities or to Seattle's household hazardous waste collection facilities, impacts are not expected to be significant.

Waste Reduction Programs

Increased efforts at waste reduction are not expected to result in adverse transportation impacts. Relative to the No Action alternative, efforts to increase on-site management of yard waste could decrease average daily system-wide trips by about 100 trips per day. About 70 percent of this reduction would occur at the North Station. Without these waste reduction efforts, growth would add about 120 average daily trips to the North Station. With the Draft Plan's proposed changes, the number would drop to about 50.

Increases in Truck Trips Due to Changes in Residential Curbside Recycling

The Draft Plan recommends efforts to increase multi-family participation in Seattle's residential curbside recyclables collection program as well as collecting additional materials, such as plastics, through that program. Collecting additional materials and increasing multi-family participation will shift materials from "garbage" trucks that carry five to eight tons, on average, to trucks that carry as little as two tons of material. This will increase the total number of collection truck trips in the system, with a slight decrease in the number of trucks delivering garbage to transfer stations and a somewhat larger increase in the number of trucks delivering recyclables for processing. Overall, however, these changes would result in fewer than ten additional average daily trips system wide, and would have a negligible effect on both the City's transfer stations and private facilities within the City.

Changes in Collection Frequency

The Draft Plan recommends changing the collection frequency for residential recyclables and yard waste to every other week citywide, except in the winter when yard waste would be collected monthly. These changes would have little effect on the total miles traveled by collection trucks, but would change the distribution of collection trips in the City. For example, the number of trucks in neighborhoods north of the Ship Canal would be reduced from about 12 trucks per month to about eight trucks per month. Between the Ship Canal and Yesler Avenue, trucks in neighborhoods would be reduced from about nine to eight trucks per month, and south of Yesler, trucks in neighborhoods would increase from about six to eight trucks per month. The actual number of times each truck passes a given residence would depend on the specific routing of collection vehicles. For example, an individual truck could pass by three times: once on each side of the street, and once through an alley.

Food Waste Collection and Transfer

The Draft Plan recommends requesting bids for residential food waste collection or co-collection of yard waste/vegetative food waste. Co-collection of yard waste/vegetative food waste would not affect the number of trucks collecting materials in a given area. Adding a separate vehicle for residential food waste collection would add another truck collecting materials on a weekly basis. While this change would have insignificant effects on street congestion, the additional trucks could be annoying to some residents.

Both of these changes would affect the number of deliveries to transfer stations. For example, if food waste transfer is proposed at the South Station, traffic at that station would increase by about 40 average daily trips in addition to the trips added as a result of population and economic growth. Assuming no other changes at the South Station, the facility and surrounding road network are expected to be capable of accommodating these changes. While adding trips to the South Station, food waste transfer at that location would reduce traffic by about ten trips per day at the North Station; by about 14 trips per day at Eastmont; and by about 22 trips per day at Third and Lander.

New Recycle Center at the City's South Recycling and Disposal Station

The Draft Plan also recommends the addition of a new self-haul recycle center at the City's South Station coupled with rate incentives to encourage self-haul customers to shift from the North to the South Station. **Figure 4** in **Part 1** of this EIS shows one possible location where the new recycle center would be constructed. SPU estimates that the new recycle center and rate incentives could result in up to two-thirds of the City's self-haul customers using the South Station. (Currently, two-thirds of the City's self-haul customers use the North Station.)

This change would substantially improve intake capacity problems at the North Station. For example, in 1995 self-haul traffic at the North Station accounted for about 930 average daily trips, by 2014 the number would increase to about 1030 average daily trips due to growth. With the addition of the recommended recycle center and rate incentives, self-haul traffic at the North Station would decline to about 600 average daily trips in 2014. Peak weekend traffic in 2014 would drop from about 1650 daily trips to 1030 daily trips, which is less than the peak weekend traffic currently experienced at the North Station. Thus, this change should substantially reduce and potentially eliminate off-site queues at the North Station.

Traffic at the South Station would increase as a result of the new recycle center and rate incentives. Self-haul trips at the South Station would increase from a base level of about 560 average daily trips in 1995 to about 630 average daily trips in 2014 due solely to the effects of growth. With the new recycle center and rate incentives, self-haul traffic in 2014 would further increase to about 1000 average daily trips. Peak weekend trips in 2014 are estimated at 1700 average daily trips.

With these peak traffic volumes, the new recycle center would create the potential for both on-site and off-site queues. These effects would be reduced somewhat by providing a separate, additional entrance to the recycle center. However, if access to the recycle center is just inside the main entrance to the site, inbound recycle center traffic sometimes could back up onto the main entrance road and then onto Fifth Avenue South. In that case, trucks and other vehicles destined for the transfer building would have their access blocked. On the other hand if vehicles exiting the site back up past the recycle center exit, queues could be created within the recycle center itself.

Reallocation of Materials Among Public and Private Transfer Stations

The Draft Plan recommends a process forrebidding residential collection contracts that would allow private companies to propose system changes that possibly could shift curbside-collected residential garbage, yard waste, and recyclables from one transfer station to another. (Self-haul customers would continue to use the City's North and South Stations.) The Draft Plan also recommends requesting bids for both vegetative food waste/yard waste and food waste only collection.

Actual changes to the flow of curbside-collected materials would depend on actual proposals and on the City's selection of contractors. However, the recommended approach of awarding collection contracts for garbage, yard waste, and recyclables to a singleproposer within a given zone may tend to shift materials toward facilities affiliated with the firms that are awarded the contracts. Therefore, this EIS evaluates "maximum impact" reallocations of materials that could occur at individual stations. It is important to note, however, that the amount of material in the entire system will remain the same. Thus, the maximum impact traffic estimates could not occur simultaneously at all transfer stations.

Maximum impact deliveries to the North Station would be similar to No Action. At the South Station, an additional 140 average daily truck trips is estimated to be the maximum impact in 2014 that could result from a reallocation of materials collected from Seattle residences. These trips would primarily affect weekday traffic levels and are not expected to result in significant weekday queuing problems.

At Third and Lander, the maximum impact in 2014 is estimated to be 180 additional average daily truck trips compared to No Action. At Eastmont, the maximum impact is estimated at 220 additional average daily truck trips by 2014 compared to No Action. Neither of these scenarios would result in significant traffic volume impacts to the surrounding road system, provided the intake capabilities of the stations are adequate.

Cumulative Impacts of Possible Changes at the South Recycling and Disposal Station

Taken together, the Draft Plan's recommendations could result in a number of changes at the South Station, including:

- A new recycle center and incentives to shift self-haul customers from the North Station to the South Station.
- A shift of curbside-collected residential yard waste from the North Station to the South Station.

- The possible addition of food waste transfer.
- The possible reallocation of materials that now go to other stations.

Taken together, these changes could increase traffic at the South Station by about 610 average daily car and truck trips**,** with a peak increase of about 700 trips on weekends. These increases would likely generate on- and off-site queues at the facility on busy weekdays and on average and busy weekends. Without mitigation, off-site queues could exceed 800 feet on the weekends.

New Transfer Facilities

New, possibly specialized, transfer facilities could also be proposed in response to the Draft Plan's recommended process for rebidding its residential collection contracts. The traffic impacts of a new transfer facility would be site specific and would depend on the capacity of the surrounding road network as well as on the amount of material handled. For example, if a new food waste transfer facility was proposed that handled food waste from two out of three service zones and 50 percent of the commercial food waste generated in Seattle, it could generate about 70 average daily trips. Trips at one or both of Seattle's two stations would be proportionately reduced, reflecting the removal of food waste from the residential garbage.

Other new facilities that could be proposed include new food waste processing, recyclables processing, and/or new yard waste/vegetative food waste facilities. It is likely that material generated in Seattle would only contribute a portion of the material processed at these new facilities. If all of Seattle's food waste went to a single new facility, it would contribute about 20,000 annual and about 55 average daily truck trips. The impacts of a new facility would be site specific and would depend on the surrounding road network, the level of activity from nearby land uses, and the total amount of material handled at the facility.

New Technologies

Another possible outcome would be for a new technology, such as a collection system that does not require traditional transfer, to be proposed. Assuming that five new staging areas were proposed to serve two out of three zones, annual trips to each staging area could average about 8,000 trips or about 310 trips per week. If trips occurred all on one day, these staging areas could result in significant truck traffic, unless they are located in commercial areas along arterial streets with moderate existing traffic volumes.

2.2.4 Impacts from Alternatives to the Proposed Action

Other alternatives considered but not recommended in the Draft Plan that have the potential to substantially affect traffic include mandatory recycling, a ban on grass in yard waste and food waste/yard waste transfer at the City's North Station. Traffic impacts from a new self-haul material recovery facility at the South Station would be similar to those resulting from the recommended recycle center.

Grass Ban

A ban on grass in yard waste would decrease yard waste tonnage by about 30 to 35 percent depending on the effectiveness of the ban compared to No Action. This would further reduce the number of trucks delivering yard waste to transfer stations. For example, with No Action, curbside-collected yard waste deliveries to the South Station in 2014 would be 30 average daily trips; assuming the yard waste transfer function is shifted from the North to the South Station with a grass ban, curbside-collected yard waste trips would drop to about 20 average daily trips.

Mandatory Participation in Recycling

Mandatory participation in recycling programs and/or mandatory separation of materials for recycling would change the flow of materials generated in Seattle through the City's public and private stations by shifting trips from garbage trucks to recycling collection trucks. This would have the net effect of reducing traffic at Seattle's North and South stations and at Eastmont. Effects on total traffic (self-haul and large trucks) at the City's two stations would be relatively minor. At Eastmont, where there is no self-haul traffic, average daily trips would drop from 110 (No Action) to about 90.

Relative to No Action and assuming no new transfer stations are developed, the greatest potential adverse impact would be at the Recycle America facility where the number of trips could increase by up to 50 percent. However, because Recycle America is a relatively small traffic generator within the context of the industrial area in which it is located, impacts on surrounding streets would likely not be significant, provided that the intake capacity of the facility could accommodate the additional trips without queues developing. In response to mandatory recycling, new recyclables transfer stations possibly could be developed, in which case the impacts would be distributed to areas around the new facilities.

Food Waste/Yard Waste Transfer at the City's North Station

Yard waste transfer at the City's North Station would result in impacts similar to No Action since No Action would continue existing programs, including yard waste transfer, at that facility. If food waste transfer was also implemented at North, it would add an additional 34 average daily trips by 2014 compared to No Action and could aggravate queuing problems especially on peak weekdays.

2.2.5 Potential Mitigation Measures

Based on the previous analysis, significant adverse transportation impacts could result from changes at the City's South Recycling and Disposal Station or in the vicinity of new facilities. Mitigation measures to help address these impacts include:

- At Seattle's South Recycling and Disposal Station:
  - If possible, provide a separate entrance to the new facility as far north along Fifth Avenue South as possible, or provide a clockwise traffic circulation pattern around the site.
  - Monitor peak day traffic operations and queuing on an ongoing basis and, if ingress queues exceed on-site storage capacity on an ongoing basis, add a southbound right-turn lane to Fifth Avenue South along the site frontage, or consider implementing pricing or other incentives to "level out" self-haul traffic peaks.
- For new recycling facilities:
  - Consider requesting that facilities provide information on access, capacity, potential off-site traffic impacts, and mitigation as a condition of qualifying for economic development incentives.
- For new centralized composting facilities:
  - Consider using submittal and specification requirements for rebidding residential collection contracts to encourage proposers to take into account traffic impacts in the siting and design of new facilities. For example, proposers could be asked to submit information on the total capacity of the facility, expected peak day and peak hour traffic generation, traffic and condition of surrounding roads, expected traffic impacts of their facilities, and planned mitigation.

2.2.6 Significant Unavoidable Adverse Impacts

Although the Draft Plan's recommendations coupled with population and economic growth could increase traffic near existing transfer stations, in general these adverse impacts are not expected to be significant.

Recommendations that would help alleviate existing traffic problems at the North Station could eventually result in on and off-site queuing problems at the South Station. The actual level of impact will depend on the effectiveness of the Draft Plan's recommended rate incentives, which are designed to encourage self-haul customers to use the South Station. Traffic impacts could also result from the development of new facilities; the significance of such impacts would be site specific.

2.3 AIR

2.3.1 Affected Environment

Potential Pollutants

Pollutants that could potentially be affected by the Proposed Action or alternatives include:

- **PM_{10}.** Suspended particles less than 10 micrometers in diameter PM_{10} can be inhaled deeply and are linked to human health impacts. PM_{10} is generated by industrial operations, residential wood burning, motor vehicle fuel combustion, and tire action on pavement.
- **Ozone.** Ozone is a highly reactive form of oxygen created by sunlight-activated transformations of nitrogen oxides and volatile organic compounds (ozone precursors) in the atmosphere. Ozone is typically caused by motor vehicles. Ozone can cause eye, nose, and throat irritation and, with prolonged exposure, chronic respiratory disease. Ozone problems tend to be more widespread than many other air pollutant problems because of the time required for ozone precursors to be transformed into ozone. During this time period, the precursors can be transported far from their sources.
- **Carbon Monoxide.** Carbon monoxide (CO) is a product of incomplete combustion and is often generated by motor vehicles and residential space heating, especially with wood. Carbon monoxide problems tend to be localized near congested roadways or intersections. Carbon monoxide interferes with the capacity of blood to carry oxygen and, at the levels associated with highway congestion, can cause headache, nausea, weakness, dizziness, and angina.
- **Odor.** Odor is classified as a nuisance pollutant—one which is evaluated and regulated without identification of the specific chemicals involved. Because odor is based on human perception, it cannot be measured by a machine. Facilities handling garbage, yard waste, or food waste can create odor problems because of chemicals that are emitted as this material decomposes.
- **Fugitive Dust.** Fugitive dust is composed of soil particles that are entrained in the air, typically due to the action of wind or machinery on exposed surfaces. Fugitive dust can cause nuisance impacts if it is deposited on off-site properties or creates noticeable conditions off-site.

Regulations

Except for nuisance pollutants, air quality is generally assessed in terms of whether pollutant concentrations are higher or lower than ambient air quality standards set to protect human health. The following agencies generally have jurisdiction over ambient air quality in the potentially affected area: the U.S. Environmental Protection Agency (EPA); the Washington Department of Ecology (Ecology); the Oregon Department of Environmental Quality (DEQ); and the Puget Sound Air Pollution Control Agency (PSAPCA), which is the local agency

responsible for Seattle and King, Snohomish, and Pierce counties. These agencies issue regulations that govern both the concentrations of pollutants in outdoor air and contaminant emissions from air pollutant sources. **Table 6** summarizes applicable EPA, Washington State, and PSAPCA standards. In cases where the standards are not identical, the more stringent standard would apply.

TABLE 6 - APPLICABLE AMBIENT AIR QUALITY STANDARDS

Pollutant	EPA		Washington State	PSAPCA
	Primary	Secondary		
Total Suspended Particulate Matter (TSP)				
Annual Geometric Mean (mg/m^3)			60	
24-Hour Average (mg/m^3)			150 [a]	
Inhalable Particulate Matter (PM_{10})				
Annual Average (mg/m^3) [b]	50	50	50	50
24-Hour Average (mg/m^3)	150 [c]	150 [c]	150 [d]	150 [d]
Carbon Monoxide (CO)				
8-Hour Average (ppm) [a]	9	9	9	9
1-Hour Average (ppm) [a]	35	35	35	35
Ozone (O_3)				
8-Hour Average (ppm)	0.08 [f]	0.08 [f]	[e]	[e]
1-Hour Average (ppm)			0.12 [d]	0.12 [d]

NOTES: mg/m^3 = micrograms per cubic meter **ppm** = parts per million; blank cells indicate no standard.
All values not to be exceeded except as noted; all averages are arithmetic except TSP, which is the annual geometric mean.

[a] Not to be exceeded more than once per year
[b] Attainment based on 3-year average
[c] Attainment based on 3-year average of the 99th percentile of 24-hour PM_{10} concentrations
[d] Attainment if expected number of events above this limit is less than or equal to one
[e] Not yet established
[f] Attainment based on 3-year average of the 4th highest daily maximum 8-hour ozone concentration

Regulatory agencies have discretion in regulating nuisance pollutants. For example, PSAPCA regulations generally do not allow odor, fugitive dust, or other nuisances to be noticeable off site. Enforcement of nuisance regulations is based on the opinions of PSAPCA inspectors as well as complaints. In order to enforce mitigation, PSAPCA has the authority to issue Notices of Violation and enter into consent decrees with facilities causing odor or dust problems.

Effects of Climate on Air Quality

The Puget Sound region has a marine climate with prevailing winds from the Pacific Ocean and Puget Sound. Thermal inversions, often lasting until late in the day or for several days, occur in the winter. These inversions limit the dispersion of pollutants, resulting in higher levels of pollutants, such as carbon monoxide, emitted at ground level.

The effects of climate on odor are more complex. For biologically-generated odors, such as those found at solid waste facilities, odors are often greatest during warm weather. However, in the Puget Sound area, moderate temperatures and wet weather during the fall and spring support biological activity and odor formation. In addition, temperature inversions may limit odor dispersal in the winter. Thus, odor problems can occur at all times of the year in the Puget Sound region. Complaints are highest in the summer, however, when more people are outdoors. In eastern Oregon, drier conditions generally suppress odor formation although odors can be a problem during hot summer months.

Existing Air Quality

Typical sources of air pollution in the area potentially affected by the Proposed Action and alternatives include traffic, wood burning stoves and fireplaces, other forms of space heating, marine vessels, rail lines, industrial sources, and facilities that transfer, process, or dispose of garbage, yard waste, and food waste.

Existing air quality in the Puget Sound region has generally improved over the last decade. For example, in 1990 PSAPCA designated all of Snohomish, King, and Pierce counties as non-attainment areas for ozone, which means that ambient air quality at certain PSAPCA monitoring stations violated ambient air quality standards for that pollutant. Recently, however, EPAredesignated the three counties as an ozone attainment area based on the results of ongoing monitoring and ozone control measures called for in the area's air quality maintenance plan (Ecology, 1997). As a result of generally improving air quality in the region, the Puget Sound also was recently redesignated as an attainment area for both PM_{10} and carbon monoxide. The area continues to be classified as a maintenance area, which means that specific actions are being taken by PSAPCA to assure continued compliance.

Odor problems are usually highly localized. Odor complaints have been filed with PSAPCA for most composting facilities and for transfer stations in the Puget Sound region.

In eastern Oregon, air quality is generally better than in the Puget Sound region, due to eastern Oregon's lower population, lower traffic volumes, and more scattered industrial sources. In dry weather, however, dry-land wheat farming practices can lead to large, severe dust storms and agricultural operations can be a source of localized odor impacts.

2.3.2 Impacts—No Action Alternative

The following discussions highlight adverse impacts to air that could result from a continuation of Seattle's current programs, services, and policies related to solid waste management.

Waste Reduction

The No Action Alternative would continue Seattle's waste reduction programs. Programs that encourage less packaging or reuse of non-organic materials are not expected to adversely affect air quality. In addition, grasscycling is not expected to result in odor impacts because the small amount of grass cut at any one time is spread out over a large area. This practice does not lead to the anaerobic (oxygen poor) conditions most likely to give rise to odor problems from decomposing grass. A literature review conducted for this EIS also revealed no substantiated odor problems associated withgrasscycling (Winges, 1998).

On-site composting of yard wasteand food waste could lead to localized odor problems and, depending on the proximity of the compost pile to neighbors could, at times, be noticeable on adjacent properties. Improper composting practices, such as failure to turn compost piles, is the greatest cause of odor problems. The potential for compost piles to create odors would be greater when grass clippings are composted without brush, leaves, or other materials that are rich in carbon because grass's high nitrogen content and low porosity can lead to anaerobic conditions and subsequently to the formation of compounds such as ammonia. Because backyard food waste composting has a higher potential for creating odors, Seattle promotes small containerized units, such as worm bins and green cones, for backyard composting of food waste.

In practice, it appears that odor problems from backyard composting are rare. For example, a SPU survey indicates that about 40 percent of the single-family households in Seattle engage in backyard composting including about 25 percent that compost food waste. However, SPU's composting hotline receives about two to three complaints per year that are related to odors from backyard composting, and the problems usually have been with food waste (Quin, 1998). The Seattle-King County Department of Health also indicated that they receive very few complaints regarding nuisance odors caused by backyard composting (Moran, 1998). Vancouver, British Columbia's backyard composting program, which is similar to Seattle's, has experienced a similar history of few complaints (Levinston, 1998).

Collection, Transfer, and Processing

The No Action Alternative would continue current collection, transfer, and processing practices for garbage, yard waste, and recyclables. Currently, these materials are collected by separate trucks and are delivered to the facilities described in **Section 1.2.1**.

Odor and Air Quality Impacts Along Collection Routes. If current practices were to continue, at certain times up to three trucks could be collecting material in any one week, and in certain neighborhoods trucks may make more than one pass down a street. Emissions from this number of trucks are not expected to cause an exceedence of ambient air quality standards for carbon monoxide or PM_{10} along collection routes. Some localized problems with fumes and odors could occur along routes in the immediate vicinity of collection vehicles, especially as they stop, start and idle along their routes, because emissions from vehicles generally increase as speeds decrease. Localized odors could also occur at the curb when garbage and yard waste are put out for collection.

Odor and Air Quality Impacts Near Transfer Stations. There would be a greater potential air quality impacts from traffic in the immediate vicinity of transfer stations because of localized congestion and traffic. These effects are not expected to contribute significantly to regional air quality degradation. However, they can substantially affect local air quality around the stations, especially if extended queues develop, since queuing generally increases carbon monoxide and other pollutants (EPA, 1985). At certain times, extended queues from self-haul traffic currently develop at the City's transfer stations, especially at the North Recycling and Disposal Station (North Station). With No Action, self-haul queues are expected to get worse as Seattle's population increases (see **Section 2.2.2, *Transportation*)**.

Within transfer buildings, elevated levels of PM_{10} and carbon monoxide can develop due to emissions from operation of dozers and other heavy equipment and dust generated as waste is processed in the pit and compacted.

Transfer stations can also cause off-site odor problems from handling garbage and yard waste, especially if they are not enclosed. Transfer stations that primarily handle construction and demolition debris or recyclables are not expected to cause significant off-site odor problems. However, at times they could experience problems with on-site fugitive dust. Transfer stations that primarily handle commercial waste would have a lower potential for off-site odor problems because commercial waste contains a smaller amount of putrescible material than does residential waste or yard waste. Because the Seattle Intermodal Facility handles containerized garbage, odor impacts are expected to be minimal at that facility.

The potential for noticeable off-site odor impacts would be greatest at the City's North Station, which is located adjacent to a residential neighborhood. In 1996, the City installed measures to help mitigate odor problems at the North Station, including a water misting system with odor neutralizer and more frequent cleaning of the waste pit. Since September, 1996, PSAPCA records indicate there have been no complaints about odors at the North Station (Nehen, 1998).

Odor Impacts From Centralized Yard Waste Composting The No Action Alternative would continue the ban on yard waste in garbage and Seattle's current practice of delivering curbside collected and self-hauled yard waste to a centralized yard waste composting facility (currently Cedar Grove Composting). Centralized yard waste composting facilities, such as Cedar Grove, can produce odors from several sources including the waste receiving and preprocessing area; areas that are actively composting yard waste; and compost curing areas. Odor complaints at Cedar Grove over the last year have caused the Seattle-King County Health Department to modify Cedar

Grove's operating permit, placing more restrictive throughput limitations on the facility and requiring closer monitoring of process parameters (Health Department, 1997).

Grass can be a major cause of odors because it degrades rapidly and because its high nitrogen content and low porosity can lead to anaerobic conditions and subsequently to the production of ammonia and other odorous nitrogen compounds. In addition, grass deliveries are substantially higher in the spring and early summer than during other times of the year. During these peaks, incoming grass can overwhelm the ability of operators to manage the composting process and control odors. This is particularly true when grass has already started to anaerobically decompose before it arrives at the composting facility and if there is no woody bulking material on hand to mix with grass loads.

However, grass also produces a high-quality compost product. Measures to manage the impact of grass include remote siting, physical isolation, and intensive feedstock management. PSAPCA has recently designated physical isolation, which involves creating a large pile with a reduced surface area to volume ratio, as an experimental Best Available Control Technology (BACT).

Disposal

The No Action Alternative would include continued long haul rail transport of garbage to the Columbia Ridge Landfill in eastern Oregon. In addition, the No Action Alternative would include continued post-closure monitoring of the Kent Highlands and Midway landfills. Air quality and odor impacts along the train route are not expected to be significant because the garbage would continue to be transported in closed containers.

Potential air quality impacts from landfilling include fugitive dust and vehicle emissions, landfill gas emissions, and odor. Dust is caused by trucks unloading waste and the movement of heavy equipment during landfilling operations and new cell construction. Odor can be caused by landfill gas or from the waste itself. Odor impacts from waste are greatest during the active landfilling period. These odors do not, however, tend to travel more than a few hundred feet.

Landfill gas, which consists of methane, carbon dioxide, and volatile organics, tends to escape from the surface of the waste and dissipate. After portions of a landfill are closed, however, the gas can migrate laterally unless a liner is installed to minimize lateral migration.

The *1990 Seattle Waste Transport and Disposal Project Environmental Impact Statement*, which is incorporated by reference, concluded that the Seattle Waste and Disposal Contract would result in air impacts at the Seattle Intermodal Facility, along rail routes, and at the Columbia Ridge Landfill and Recycling Center. Impacts identified for the Intermodal Facility included a slight increase in emissions and fugitive dust from trucks and the potential for odors from solid waste containers if they sit for extended periods of time. Air impacts identified for the Columbia Ridge Landfill included wind erosion resulting in fugitive dust; vehicle emissions; and potential odors and gaseous emissions during waste handling, waste decomposition, and possibly from a leachate collection and removal system. Recommended mitigation measures included: use of sealed containers, inventory control, regular container cleaning and maintenance, and limited storage at the Intermodal Facility; a landfill liner system; establishing and maintaining vegetative cover over exposed landfill surfaces; landfill gas monitoring; and, if necessary, landfill gas collection.

The EIS determined that landfill gas collection might be unnecessary because the rate of landfill gas generated in dry climates, such as those found near the Columbia Ridge Landfill, tends to be lower than in wet climates because the rate of decomposition is slower. Landfills that do generate appreciable amounts of gas are typically equipped with gas collection and flare systems. However, even with these systems there would continue to be residual air quality impacts such as emission of sulfur dioxide and oxides of nitrogen by the flares. Generally, however, these impacts are small and do not cause or contribute to violations of ambient standards.

Seattle's closed landfills also have the potential to generate landfill gas although the rate of gas production typically decreases over time. The Kent Highlands and Midway landfills are equipped with gas flare and monitoring systems to control impacts from landfill gas. Seattle monitors other closed landfills as needed based on land use and development proposals for adjacent properties.

Special Waste

Impacts to air quality from special waste can result from transfer, handling, and disposal of biomedical waste, and spills of chemicals at the City's household hazardous waste facilities. Incineration of medical waste can cause localized air quality impacts and are regulated as point sources by Ecology and local air quality agencies such as PSAPCA.

Spills of chemicals at one of Seattle's household hazardous waste facilities are not likely to pose a major threat to air quality because of the nature of the chemicals involved, the relatively small amounts collected, and containment features and emergency procedures in place at the facilities. If a large quantity of paint thinner or gasoline were spilled, some local odor impacts might result for a short period, but the impacts would not be widespread and would dissipate rapidly.

2.3.3 Additional Impacts of the Proposed Action

This section describes additional air quality and odor impacts, compared to No Action, that could result from implementation of the Draft Plan's recommendations.

Waste Reduction

The Proposed Action would place a greater emphasis on waste reduction, particularly targeting on-site management of yard waste, producer responsibility programs, and programs to reduce the amount of paper disposed of and recycled. Producer responsibility programs and programs to reduce paper are not expected to have an adverse effect on air quality.

Potential For Increased Localized Odor From On-Site Composting and Illegal Dumping. The Proposed Action would likely lead to increased participation in grasscycling and on-site composting due to the increased efforts at promotion and the recommended variable can rate for yard waste collection. To the extent that more people participate in backyard composting, localized odor problems, which now occur infrequently, could become proportionally more frequent. However, it is unlikely that odor impacts from backyard composting would reach a threshold where, for example, an entire block or neighborhood would experience odor problems. It is also possible that the variable can rate for yard waste collection coupled with the ban on yard waste disposal in garbage could result in some illegal dumping of grass clippings and other yard waste. This in turn could cause localized odor problems near the illegal dump sites.

Reduced Demand For Centralized Composting Facilities. Compared to No Action, the Proposed Action would increase on-site management of organic material and thereby reduce Seattle's demand for centralized yard waste composting services. In addition, the Draft Plan's recommended approach for bidding its residential collection contracts could lead to Seattle's yard waste being composted at several facilities. Experience with decentralized composting suggests that, to the degree that composting can be distributed over a larger area rather than centralized, odor impacts tend to be lessened (Rockwell et. al., 1997; Pick, 1996). In addition, to the extent that more remote sites are used, the potential for off-site odor impacts would also be reduced.

Recycling

Efforts to increase the amount of material recycled, especially efforts to remove putrescible material such as yard waste and food waste, would proportionally reduce air quality impacts resulting from the landfill disposal of Seattle's garbage. These efforts could increase traffic levels somewhat, which in turn could increase total vehicle air emissions, since trucks that haul recyclables generally carry smaller loads than garbage trucks. To the extent that recycling programs result in the development of new facilities or change the functions of existing facilities, they can create the potential for adverse air quality impacts as described under *Transfer and Processing*, below.

Collection

Changes in collection recommended in the Draft Plan that could result in adverse air impacts include changed residential collection frequencies, changes in collection vehicles and the flow of materials to transfer and processing facilities, and possible food waste collection. Other changes in collection, such as changes in recyclables collection containers, are not expected to result in adverse air quality or odor impacts.

Neighborhood Impacts Resulting From Changes in Collection Frequency and Possible Food Waste Collection. Yard waste collection would stay the same south of Yesler and become less frequent north of Yesler during the spring, summer, and fall. In the spring and summer, less frequent yard waste collection could somewhat increase the potential for odor at the curb, at transfer stations handling this material, and at composting facilities. This is because yard waste, especially grass, can become very odorous if stored in bags or in unaerated containers for any length of time – particularly in hot weather (Farrell, 1997). Waste reduction efforts could help mitigate this impact to the extent that the amount of grass collected in Seattle's curbside program is reduced.

The Proposed Action also includes the possibility of collecting residential food waste separately from residential garbage. Odor from food waste would be similar to garbage; however, the potential for leaks would be somewhat greater because there would not be as much dry material to absorb liquids from the food waste.

Less frequent yard waste collection in certain areas of the City would reduce yard waste traffic overall, but the total number of trucks collecting materials could increase if separate residential food waste collection is added. With the exception of nitrogen oxides, impacts from vehicle air emissions such as PM_{10} and carbon monoxide are more closely related to daily, rather than cumulative annual traffic volumes. Therefore, any reduction in collection frequency is unlikely to substantially improve neighborhood air quality unless the number of individual days with air quality problems are reduced. If vehicles collect all materials in a given area on the same day, impacts due to vehicle emissions would increase somewhat. While this would concentrate impacts into a single day, the impact of these changes on overall air quality would generally remain insignificant since collection truck traffic would remain, in most instances, a very minor fraction of the total traffic on residential streets.

Air Quality Impacts From Reallocation of Traffic The Draft Plan's recommended approach for rebidding residential collection contracts could lead to a reallocation of collection truck traffic among the various transfer stations in Seattle. Reallocation of collection truck traffic could increase vehicle emissions in the immediate vicinity of stations experiencing increased truck traffic. If new contracts result in extended operating hours at any of the private transfer stations, the potential for off-site odor impacts could increase to the extent that clean up time is limited, because dispersion conditions are generally poorer at night and in the early morning particularly in winter. Under such conditions, odors would be more persistent and severe due to the lack of atmospheric mixing (NAS, 1979).

New Collection Technologies Another possible outcome of the Draft Plan recommendations would be for a bidder to propose a collection technology that did not require transfer of curbside collected garbage, yard waste, and/or food waste. This type of system could have a slight benefit to air quality, since there would be no need for transfer stations to handle loose garbage, and the enclosed collection containers would release minimal odor during container transfer and storage if they were completely sealed. However, proper management would be needed to ensure containers are rapidly delivered to composting or other processing facilities, since anaerobic conditions could develop inside the containers if they were stored for extended periods. If anaerobic conditions were to develop and a container malfunctioned, then odors could be significant, though localized. If anaerobic conditions were to develop in containers bound for yard waste or food waste processing facilities, odors produced at those facilities could also increase.

Transfer and Processing

Changes in Air Quality and Odor at the North Recycling and Disposal Station and South Recycling and Disposal Station. The Draft Plan recommends a number of changes at the North and South Stations including: developing a self-haul recycling center at the South Station coupled with an economic incentive for self-haul customers to use the South Station; providing C&D debris recycling at the South Station; and banning curbside collected yard waste at the North Station and directing those materials to the South Station, or possibly private

stations. These changes should reduce air quality impacts at the North Station relative to the No Action Alternative because the total number of self-haul vehicles at the North Station would be reduced by about 30 to 40 percent, which in turn would reduce the potential for queuing.

In addition, eliminating curbside-collected yard waste transfer at the North Station would reduce the amount of odor-causing material coming into that station. As a result of these changes, self-haul vehicle traffic and yard waste deliveries would likely increase at the South Station. However, the South Station is also farther removed from residences than is the North Station. Therefore, these changes are not expected to significantly degrade air quality or cause a substantial increase in odor at the South Station. Localized increases in air emissions, fugitive dust, and odor could occur near the new recycle center and C&D debris recycling area.

Siting New Processing Facilities For Recyclables The Draft Plan recommends that Seattle provide economic development incentives for recyclables processing and manufacturing facilities using recycled materials to locate within the City of Seattle. Minor air quality impacts associated with vehicle emissions could occur in the immediate vicinity of these facilities and would be similar to vehicle emissions impacts at transfer stations. To the extent that processing facilities involve industrial processes, the facilities could act as point sources for a variety of air emissions such as volatile organic compounds.

Odor Impacts from New Food Waste Facilities. The Draft Plan recommends that Seattle provide incentives for the development of a new, private food waste processing facility and that the City request prices for residential food waste collection when itrebids its collection contracts. Bidders on Seattle's new collection contracts could propose food waste transfer at the South Station or at a new food waste transfer station. Odor impacts would be similar to odors resulting from garbage and yard waste transfer.

As discussed in **Section 1.2.2**, food waste processing would most likely employ composting (aerobic decomposition) but could also involve anaerobic digestion or conversion to animal feed. The principal issue for such facilities would be odor caused by the decomposition of organic materials. Unlike yard waste composting facilities, which generate odor from the anaerobic decomposition of vegetative material into nitrogen compounds such as ammonia, an all food waste facility could also accept meat, fish, and dairy products. These materials have a high potential for odor and can cause odor with a different quality than caused by decomposing vegetative waste. Specifically, the decomposition of these materials can create sulfur compounds, such as hydrogen sulfide, and odorous organic compounds such as putrescine.

Another possibility would be vegetative food waste/yard waste co-composting and collection. Odor and air quality impacts from yard waste/vegetative food waste co-composting facilities would be similar to those experienced at yard waste composting facilities. Vegetative food waste has many of the same characteristics as grass. Therefore, adding vegetative food waste without reducing the grass content of yard waste would increase the potential of odor at the composting facility.

Odor from co-collection of yard waste and vegetative food waste would also be similar to those resulting from yard waste and garbage collection and would be most closely related to collection frequency and the types of containers used. As with yard waste, localized odors could result if the material is held in air-tight containers, and these odors would also contribute to odor problems where the material is transferred and processed. Pilot studies of vegetative food waste/yard waste co-collection and commingled collection (King County Solid Waste Division, 1996) and vegetative food waste collection (Seattle Solid Waste Utility, 1995) indicated few concerns about odor among participants.

2.3.4 Impacts from Alternatives to the Proposed Action

Other alternatives with the potential to affect air quality and odor include development of a commingled, self-haul material recovery facility at the South Station, banning grass or food waste from garbage, every other week garbage collection, and transferring yard waste/food waste at the North Station.

Air quality and odor impacts inside a co-mingled material recovery facility at the South Station would be greater than at a recycling center because garbage would be mixed with recyclables and because vehicles such as dozers would operate inside of the building. Odor impacts likely would be somewhat lower than at the City's transfer

buildings, however, because self-haul garbage contains a lower percentage of putrescible material than does curbside collected residential garbage.

As discussed above, grass is a significant contributor to odor at yard waste composting facilities and some cities, such as New York, are seriously considering banning grass from their waste stream, due primarily to odor problems (Rockwell et. al., 1997). Such a ban would likely significantly reduce odors at yard waste facilities, because in many cases grass arrives at these facilities in an odorous condition, and it is difficult to prevent odor formation at the composting facility when the arriving material already has a significant odor (Farrell, 1997). In addition a ban on grass would eliminate operational problems that result because grass production is highly seasonal. Bans could lead to localized odor problems if illegal dumping increases.

Bi-weekly garbage collection could increase odors at the curb and at transfer stations. Because the North Station is located near a residential neighborhood, off-site impacts at that location could be more pronounced. However, because this alternative would be coupled with separate food waste collection, odor impacts would be reduced somewhat.

The odor impacts of food waste transfer at the North Station would be similar to No Action. A greater potential for odor impacts to the surrounding community would result from the addition of food waste transfer at the North Station. Although Seattle has little experience with food waste handling, evidence from other municipalities which have added food waste transfer suggests that localized odors can be generated. Given the close proximity of residences to the North Station, the possibility of odor impacts to the surrounding community would be greater at the North Station than at the South Station. The level of impact would depend on the size, location, and duration of food waste storage at the site. Other factors, such as the degree of odor in the food waste prior to arrival at the North Station, would be beyond the control of the City.

2.3.5 Potential Mitigation Measures

Mitigation measures that would reduce air quality and odor impacts associated with the Proposed Action include:

- For backyard composting:
  - Incorporate education on proper composting techniques, such as controlling the type of materials and regularly turning compost piles, into education, outreach, and technical assistance programs.
  - Encourage backyard composters to separately compost food wastes and to avoid composting meat and meat products.
- For collection of yard waste and/or food waste:
  - Encourage jurisdictional health departments to enforce collection vehicle cleaning requirements.
  - Require bidders to describe leak prevention measures for food waste collection vehicles.
  - Consider issues such as total vehicle miles traveled and queuing at transfer stations when evaluating collection contract bids.
- At the South Station:
  - Monitor off-site odor complaints at the South Station and, if odor problems arise, implement odor control measures such as those previously implemented at the North Station.
- For centralized composting facilities:
  - Consider using performance specifications and submittal requirements for the upcoming residential collection bidding process to encourage private facilities to be sited, designed, and operated in a manner that reduces the potential for off-site odors. For example, bidders could be required to submit information on their prior experience with similar successful facilities, operator experience and technical support, financial capabilities, proposed sites, their capacities, buffers, feedstocks, methods to ensure that incoming materials are promptly processed, aeration methods, process controls, and methods for managing grass. A grass management plan could include feedstock controls to ensure adequate bulking

materials are available; physical isolation of odor causing materials such as large, slowly decomposing compost piles with minimum surface area; and possibly use as green mulch during the peak grass season.

- Possibly require that some facilities, such as new facilities receiving food waste from Seattle, enclose all or portions of their operations (such as waste receiving and initial composting) and treat exhaust air. Treatment could be by biofilter or by techniques such as scrubbers, thermal oxidizers, or carbon adsorption beds. Biofilters, a bed of finished compost or other biologically active media that allows contact between microbes and odorous air, have been documented to reduce odors by up to 90 percent (Finn and Spencer, 1997). The Puget Sound Air Pollution Control Agency (PSAPCA) has indicated it prefers enclosed composting for future facilities.
- For food waste, possibly disallow certain processes, such as static piles or unaerated windrows, especially for food waste containing meat or dairy products (The Compost Council, 1996).

- For new recyclables processing facilities:
  - Possibly require that facilities with the potential to create air quality impacts be sited, designed, and operated in a manner that reduces off-site impacts if they are to qualify for economic development incentives.

2.3.6 Significant Unavoidable Adverse Impacts

Although mitigation measures can reduce air quality and odor impacts resulting from the operation of transfer, processing, and disposal facilities, some level of impact, especially on-site, would be unavoidable. Vehicle emission impacts near facilities would also be unavoidable, though localized. Vehicle emission impacts along collection routes are not likely to be significant.

2.4 NOISE

2.4.1. Affected Environment

Noise Characteristics and Measurements

Sound, which is made up of minute air pressure fluctuations caused by some type of vibration, travels through the air in waves. Any unwanted sound is considered noise. People can hear a broad range of frequencies and intensities. Therefore, the decibel scale that measures sound is logarithmic, which compresses the range of intensities. The "A-weighted" decibel scale (dBA scale) also accounts for the human ear's sensitivity to different frequencies. This dBA scale is used for describing noise levels in this section unless otherwise noted.

The minimum sound level variation perceptible to a human observer is about 3 dBA. A 5 dBA change is clearly perceptible, and an 8 to 10 dBA increase is perceived as a doubling of loudness. Common sounds and perceived intensities are shown in **Table 7**.

TABLE 7 - COMMON NOISE SOURCES

Typical Sound	Sound Level, dBA	Subjective Impression
Jet Takeoff	140	Potential hearing loss
Siren at 100 ft.	120	Threshold of pain
Accelerating Motorcycle	110	Threshold of discomfort
Power Lawnmower	100	Very loud
Train Whistle	90	Loud
Busy Street	80	Intolerable for phone use
Average Street Noise	70	Moderately loud
Normal Conversation	60	Usual background
Quiet Street Noise	50	Moderately quiet
Private Office	40	Noticeably quiet
Empty Auditorium	30	Very quiet

Source: Various

Regulations and Guidelines

City of Seattle Noise Ordinance

Noise is regulated in Seattle by the Department of Construction and Land Use (DCLU) and is limited by the Seattle Noise Control Ordinance (SMC 25.08). This ordinance limits noise levels based on the zoning district of both the source and receiving properties, the time of day, and the duration of the noise. Maximum permissible noise levels between various zoning districts are shown in **Table 8**.

TABLE 8 - MAXIMUM PERMISSIBLE SOUND LEVELS-CITY OF SEATTLE

	District of Receiving Property within the City of Seattle		
District of Sound Source	**Residential, dBA**	**Commercial, dBA**	**Industrial, dBA**
Residential	55	57	60
Commercial	57	60	65
Industrial	60	65	70

These noise levels can be exceeded in any one hour by no more than 5 dBA for 15 minutes, 10 dBA for five minutes, or 15 dBA for 1.5 minutes. For example, the maximum noise level from a transfer station on industrially zoned property measured at an adjacent residentially zoned property could increase from 60 to 70 dBA for five minutes in any one hour. The residential limits in **Table 8** are reduced by 10 dBA between 10 p.m. and 7 a.m. weekdays and between 10 p.m. and 9 a.m. on weekends or holidays.

King County Noise Code

As shown in **Table 9**, the King County Noise Code (Chapter 12.88) defines maximum allowable environmental noise levels that are similar to Seattle's, with the addition of a Rural Zone. The residential and rural limits are decreased by 10 dBA at night.

TABLE 9 - MAXIMUM PERMISSIBLE SOUND LEVELS-KING COUNTY

	District of Receiving Property within King County			
District of Sound Source	**Rural, dBA**	**Residential, dBA**	**Commercial, dBA**	**Industrial, dBA**
Rural	49	52	55	57
Residential	52	55	57	60
Commercial	55	57	60	65
Industrial	57	60	65	70

Other Noise Standards and Guidelines

Certain situations, such as traffic noise, are not covered or are exempted by these local ordinances. However, Federal guidelines can be used to evaluate the level of noise impact. Federal agencies use the equivalent sound level (L_{eq}) and the day-night sound level (L_{dn}) when evaluating noise impacts. L_{eq} is a constant sound that has the same energy as a fluctuating sound averaged over a period of time. For example, $L_{eq}(24)$ is equivalent to a fluctuating sound averaged over a 24 hour period. L_{dn} is similar to the $L_{eq}(24)$ except that a 10 dBA penalty is added to sound levels between 10 p.m. and 7 a.m.

The U.S. Federal Highway Administration (FHWA) has identified noise criteria for evaluating road improvement projects that can be used to evaluate traffic noise impacts. The FHWA defines a traffic noise impact as traffic noise approaching or exceeding the levels in **Table 10** or a predicted traffic noise level substantially exceeding an existing noise level.

TABLE 10 - USFHWA NOISE ABATEMENT CRITERIA

Activity Category	**L_{eq} (measured over one hour)**	**Description of Activity**
A	57 (exterior)	Lands on which serenity and quiet are of extraordinary significance and serve a public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries and hospitals
C	72 (exterior)	Developed lands, properties, or activities not included in Category A or B above.
D	52 (interior)	Residences, motels, hotels, public meeting rooms,

		schools, churches, libraries, hospitals, and auditoriums.

The Environmental Protection Agency (EPA), which has no regulations governing environmental noise, has identified a relationship between increases in noise and impact. EPA guidelines have identified an increase of:

- 0-5 dBA: slight impact
- 5-10 dBA: significant impact
- >10 dBA: very serious impact

Existing Noise Levels

Neighborhood Noise Levels

Existing noise levels in Seattle's neighborhoods, business districts, and industrial areas where garbage, yard waste, and recyclables are collected can vary substantially. For example, ambient background noise levels in quiet residential neighborhoods such as those surrounding Carkeek Park, range between 40 and 45 dBA. In more active residential neighborhoods, located near commercial or industrial activities, such as those near Lake Union, background noise levels range between 60 and 65 dBA. Similar noise levels occur in commercial areas, such as University Village. Noise levels in industrial areas and at busy intersections, such as Stewart and Denny, often range between 70 and 75 dBA.

Noise Levels in Areas Surrounding Seattle's Transfer and Processing Facilities

Noise levels in areas surrounding Seattle's South Recycling and Disposal Station (South Station), North Recycling and Disposal Station (North Station), and the Aurora Household Hazardous Waste Facility also reflect the types and intensities of surrounding land uses. For example, the North Station is located in a neighborhood that is a mix of residential, commercial, and industrial uses, and the ambient, background noise level in this community without the station operating is about 60 to 62 dBA (Greenbusch, 1996). Background noise levels are dominated by traffic noise from North 34th, Stone Way North, and North Northlake Way. Much of this traffic, including truck traffic, is unrelated to the operation of the North Station.

The South Station is sited in an area that is primarily zoned industrial, and is bounded on the east by a major roadway. The nearest noise-sensitive residential properties are several hundred feet away on a hill to the west of the station.

The Aurora Household Hazardous Waste Facility is located in a mixed residential and commercial neighborhood, surrounded by several commercial facilities. This facility is open by appointment only, and most traffic in the surrounding area is unrelated to the facility's operation. Residential properties are also fairly well shielded from activity at this facility.

Noise Levels in Areas Surrounding Private Transfer, Recycling, and Processing Facilities

Several private facilities currently transfer or process garbage, yard waste, recyclables, and C&D debris generated in Seattle. The Third and Lander Station is located among commercial/distribution facilities with no nearby residential properties. Much of the truck traffic in this area is unrelated to the transfer station. The Eastmont Station is located about three-quarters of a mile from the South Station in an industrial area, with no nearby residential properties. Recycle America is located within one-quarter mile of the South Station in an industrial area. A major contributor to noise in the vicinity of Recycle America is traffic on Highway 509, which is adjacent to the eastern site boundary. Most nearby residences are located several hundred feet to the west on a hill, however, two residences are located two blocks to the west.

The Cedar Grove Composting Facility is located in the Maple Valley area of east King County. It is surrounded by King County's Cedar Hills Landfill, a gravel pit, and undeveloped land. The nearest residence is approximately one-half mile away.

2.4.2 Impacts—No Action

The following discussions highlight adverse noise impacts that would likely result from continuing Seattle's current programs, services, and policies related to solid waste management.

Waste Reduction and Recycling

Continuing Seattle's current waste reduction and recycling programs and activities generally would not result in any adverse noise impacts except at recyclables transfer and processing facilities, which are discussed under *Transfer and Processing*, below. Mulching mowers used in grasscycling could cause some localized noise impacts if they replace manual mowers; however, this impact can be reduced if electric or battery powered mulching mowers are used. Intermittent noise would also result from materials such as glass and metal being placed in recycling containers.

Collection

The No Action Alternative would continue current collection practices for garbage, yard waste, and recyclables. Currently, these materials are collected in separate trucks and are delivered to the facilities described in **Section 1.2.1.**

Continuing Seattle's collection programs for garbage, yard waste, and recyclables would result in intermittent noise along collection routes from vehicle operations, dumping glass and metal materials, and compacting materials within collection trucks. While the contribution of these activities to overall noise levels is small, maximum short-term noise levels can range from dBAs in the mid-80s to over 90 with metal dumping. This is typically perceived by nearby residents as a significant increase over typical background noise.

The amount of noise resulting from collection that is experienced by an individual neighborhood is also related to collection vehicle speed, the number of passes a hauler makes to collect materials, and road condition. Currently some neighborhoods are experiencing an individual truck making two or three passes down the same street or down the street and alley to complete their collection process. Roads with steep hills and sharp curves and road surfaces with potholes and speed bumps can all increase vehicle noise levels.

Transfer and Processing

Noise Generated by Transfer and Recycling Stations

Noise at Seattle's two stations is generated by traffic, backup alarms, waste dumping and processing within the transfer building, and handling recyclables.

The single greatest and fairly constant noise source at the two stations is the dozer moving garbage into the compactor. When operating, equipment that compresses garbage into transfer trailers also contributes to noise levels in the transfer building. The noise from this equipment is mostly engine noise, although occasionally impact noises result from the equipment's bucket banging against the walls of a transfer trailer.

Dumping recycled metal, glass, and other hard material into steel recycle bins located inside also contributes to noise levels within and outside of the transfer buildings. Occasionally recyclable metal is unloaded directly onto the concrete floor. The impact of metal against other metal debris or against the hard floor surface can cause a ringing noise for sustained periods of time. Equipment that compacts and bales cardboard also makes intermittent noise.

In the vicinity of the North Station, noise levels at adjacent residential properties were 66 to 68 dBA before noise improvements were installed (Greenbusch, 1996). These improvements included acoustical insulation to reduce peak noise levels in the surrounding neighborhoods. These improvements reduced noise levels due to garbage transfer by about 3 to 8 dBA at residences immediately adjacent to the facility. Neighborhood noise levels from recycling operations were not reduced because the collection bins are located near wall openings. Background

noise levels in the vicinity of the South Station were documented in a previous study as L_{dn} 67 dBA (Seattle Engineering Department, 1988).

Dominant noise sources from the Third and Lander, Eastmont, and Recycle America facilities are similar to those at the South Station and the North Station and include trucks hauling waste and recyclables, backup alarms, and the unloading, sorting, and compacting of waste and recyclables.

Noise levels generated by these facilities are likely similar to those generated by the South Station and the North Station; noise levels from the Third and Lander Station may be somewhat higher because of the greater volume of material handled and the 24-hour operation of this facility. Noise from trucks hauling commercial garbage, yard waste, and recyclables into the Third and Lander Station is dominant near the street. Noise from within the building also travels to surrounding properties through two large openings in the building. At the Eastmont station and Recycle America, truck noise and noise from operations within the transfer building also are noticeable off-site.

Noise Impacts From Centralized Yard Waste Composting

The No Action Alternative would continue the ban on yard waste in garbage and Seattle's current practice of delivering curbside-collected yard waste to a centralized yard waste composting facility (currently Cedar Grove Composting**).** Noise sources at these facilities include truck traffic, grinding and mixing of compost materials, moving the materials on site, and operation of aeration equipment. It is likely that these activities could result in dBA levels close to operating equipment in the high 90's to low 100's, which can risk damage to operator's hearing. King County has no noise complaints on record for this facility (Swafford, 1998), and it is likely that restrictions on the amount of material that can be processed, which were imposed in the facility's revised operating permit, would reduce the level of noise generation relative to historic levels. If material is redistributed to other facilities, however, noise levels at those facilities would increase.

Disposal

Noise sources associated with landfill disposal primarily include truck traffic and the operation of heavy equipment. The *1990 Seattle Waste Transport and Disposal Project EIS,* which is incorporated by reference, concluded that the Seattle Waste and Disposal Contract would increase noise levels at the Seattle Intermodal Facility due to a slight increase in truck traffic and along transit routes due to rail traffic near the central business district and some residences in Arlington, Oregon. That EIS also concluded that noise levels resulting from increased traffic and heavy equipment at the Columbia Ridge Landfill would be imperceptible at distances of one or more miles from the site.

Special Waste

Noise impacts associated with continuing current practices for special waste could result from operation of Seattle's household hazardous waste facilities. Although operation of the household hazardous waste facility at the South Station would generate some noise, noise from the site is dominated by operations at the transfer building and traffic. Off-site noise impacts from continued operation of the Aurora Household Hazardous Waste Facility are not expected to be significant because the facility operates only intermittently, the level of noise generation is relatively low, and sensitive off-site receptors are well shielded from the noise.

2.4.3 Additional Impacts of the Proposed Action

This section describes additional noise impacts, compared to No Action, that could result from implementing the Draft Plan's recommendations. Additional waste reduction efforts, such as promotions to reduce the amount of paper in garbage, variable can yard waste rates to encourage on-site yard waste management, and implementing the sustainable Building Action Plan are not expected to result in any additional noise impacts.

Recycling

Efforts to reduce the amount of material recycled, through increased participation and adding new materials to the types collected in Seattle's curbside program, could increase traffic levels at transfer and recycling stations somewhat since trucks that haul recyclables generally carry smaller loads than garbage trucks. In addition, dumping recyclables into containers and into collection vehicles would be a new, though minor and intermittent, source of noise for new participants in curbside recycling. To the extent that more recyclables are collected, noise levels at recycling processing facilities could also increase. Efforts to promote use of products made with recycled materials and other education and outreach efforts should not result in additional noise impacts. To the extent that recycling programs result in the development of new facilities or changes to the functions of existing facilities, they can create the potential for adverse noise impacts as described under *Transfer and Processing*, below.

Collection

Changes to collection recommended in the Draft Plan that could result in adverse noise impacts include changes to residential collection frequencies for yard waste and recyclables, changes to the flow of materials to transfer and processing facilities, and the possible addition of residential food waste collection. Other changes in collection, such as changes to recyclables containers, are not expected to result in adverse noise impacts.

Neighborhood Impacts Resulting from Changes in Collection Frequency and Possible Food Waste Collection

The Proposed Action would change collection frequencies for yard waste and recyclables. Currently yard waste is collected monthly during the winter throughout the City—a practice that the Draft Plan recommends continuing. In the spring, summer, and fall, yard waste is currently collected weekly north of Yesler and every other week south of Yesler. The Draft Plan recommends changing this collection frequency to every other week throughout the City. Similarly, recyclables are currently collected weekly north of the ship canal and monthly south of the ship canal; the Draft Plan recommends changing to every other week recyclables collection throughout the City.

In the absence of other collection changes, the proposed changes in collection frequency would reduce cumulative noise from collection in the north end of the City and increase cumulative noise from collection somewhat in the south end of the City. However, the Proposed Action could also lead to the addition of weekly residential food waste collection. If separate vehicles are used, cumulative collection noise in all neighborhoods would increase somewhat. The Proposed Action also recommends collection of various materials in a given neighborhood to be scheduled for the same day of the week, which would concentrate collection noise impacts into a single day.

Noise Impacts from Reallocation of Traffic

The Draft Plan's recommended approach forrebidding residential collection contracts could lead to a reallocation of collection truck traffic among the various transfer and processing stations in Seattle, which in turn could alter noise levels somewhat. **Section 2.2.3**, ***Transportation***, discusses potential "maximum impact" reallocations of truck traffic at the various stations.

New Collection Technologies

Another possible outcome of the Draft Plan's recommendations would be for a bidder to propose a collection technology that did not require transfer of loose curbside collected garbage, yard waste, and/or food waste. This type of system would reduce noise at transfer stations but could slightly increase noise along collection routes, especially if a fully-automated system is proposed to pickup and dump material at the curb. There would also be noise at staging areas where containers are off-loaded, loaded, and temporarily stored. Noise would be generated by hydraulic mechanisms for loading and off-loading containers and when containers impact paved surfaces. Noise would also be generated by the short-haul of containers to a rail-head for delivery to the Seattle Intermodal Facility or some other rail yard.

Transfer and Processing

Construction Impacts

Construction of new facilities would result in short-term noise increases from the operation of heavy equipment. Short-term construction noise impacts are exempt from regulations during certain hours.

Changes in Noise at North Recycling and Disposal Station and South Recycling and Disposal Station

The Draft Plan recommends developing a self-haul recycle center at the South Station, providing economic incentives for self-haulers to use the South Station rather than the North Station, providing C&D debris recycling at the South Station, and banning curbside collected yard waste at the North Station and redirecting it to the South Station or possibly other private stations. Currently about two-thirds of the self-haul traffic goes to the North Station. SPU projects that the Draft Plan's recommendations will over time result in about two-thirds of the self-haul traffic instead going to the South Station. These changes would reduce vehicle noise at the North Station and increase vehicle noise at the South Station somewhat; however, these effects should be relatively minimal because large truck traffic contributes more to noise generation at the two stations.

A self-haul recycle center at the South Station would generate impact noises from bottles and metal hitting against each other and against the sides of dumpsters or other containers used for collecting the material. C&D debris recycling could also generate impact noises as well as equipment noises if dozers are used to break up the material. With an open-sided facility located in a portion of the area now used for parking long-haul containers, these sounds could travel off-site and adversely affect homes on the hill above the station to the west. Currently recycling activities take place within the transfer building, which is located farther to the west.

The Proposed Action also includes the possibility that Seattle could eventually purchase land near the North Station to develop enhanced self-haul recycling services at that location. A self-haul recycling center on land adjacent to the North Station site would generate similar types of noise as the center proposed for the South Station. However, because homes are located in close proximity with little intervening terrain, off-site noise impacts would be more noticeable at the North Station.

Noise from New Processing Facilities for Recyclables

The Draft Plan recommends that Seattle provide economic development incentives for recyclables processing or manufacturing facilities to locate within Seattle. Noise impacts would result from the construction of new facilities, the delivery and unloading of recyclables, the shipment of finished products, and from the manufacturing process.

Noise from a New Food Waste Facility or Facilities

The Draft Plan recommends that Seattle provide incentives for the private sector to develop a new processing facility to develop food waste into useful products. The Draft Plan also recommends that Seattle obtain bids for residential food waste collection and processing (for all food waste and for commingled vegetative food waste and yard waste) when it rebids its residential collection contracts. These recommendations could lead to the development of one or more food waste composting facilities or possibly anaerobic digestion facilities; modifications for food waste transfer at private stations, or at the South Station, and/or development of a new food waste transfer station.

Major noise sources at a food waste composting or anaerobic digestion facility would likely include truck traffic, equipment for mixing incoming material with bulking agents, front-end loaders for creating compost piles and moving material, compressors and other equipment associated with forced aeration, and equipment for screening and loading the final product. Depending on the types of bulking agent used, large grinders such as those employed at yard waste composting facilities may or may not be required. An anaerobic digestion facility could also include crushers and pumps. On-site noise levels near major pieces of equipment could approach the 80 to 100 dBA range, and workers would likely be required to wear hearing protection. The level of off-site noise would depend on whether or not the facility is enclosed, the size of site buffers, and surrounding terrain. At a distance of 1000 feet, the noise levels would be about 57 to 77 dBA, based purely on distance. Erecting a partial barrier around the noise source could further reduce noise levels by 10 to 15 dBA. Enclosing the source could reduce

levels by 30 dBA or more. Noise from a vegetative food waste/yard waste co-composting facility would be similar to noise generated at yard waste composting facilities.

Noise from a new food waste transfer facility could be lower than noise at garbage transfer facilities because food waste would be easier to compact and the amount of impact-type noise should be reduced. Modifying an existing station to accommodate food waste transfer could increase noise levels, since an additional dozer could be required. If total truck deliveries were to increase as a result, traffic noise could also increase.

2.4.4 Impacts from Alternatives to the Proposed Action

Mandatory participation in recycling or separation of certain materials could further shift materials from garbage collection to recyclables collection. Because recycling collection trucks tend to have lower capacities than garbage collection trucks, this would tend to increase the number of truck deliveries to transfer and recycling stations, which could increase noise somewhat at those stations. On the other hand, grass bans would reduce the number of trucks delivering yard waste and would reduce transfer station noise somewhat. Commingled or co-collection options would reduce the number of collection vehicles operating in neighborhoods, but would have little effect near transfer and processing facilities since the total amount of material collected would be the same.

Noise generated at a commingled self-haul material recovery facility at the South Station would be louder than at the recycle center since front-end loaders, conveyors, and other equipment could be used. However, off-site noise might not be any greater since a self-haul material recovery facility would likely be partially enclosed (R.W. Beck, 1996).

Because yard waste/food waste transfer at the North Station would increase truck deliveries to the site and require an additional dozer, this alternative would aggravate off-site noise impacts relative to both No Action and the Proposed Action.

2.4.5 Potential Mitigation Measures

Mitigation measures that would reduce noise impacts resulting from the Proposed Action include:

- For collection:
  - Encourage local jurisdictions to enforce relevant noise ordinances.

- At the North Station and the South Station:
  - Conduct training and periodic inspections to ensure that employees wear appropriate hearing protection.
  - Incorporate measures to reduce noise into the orientation and design of the self-haul recycle center at the South Station and, possibly design the new center to be compatible with future installation of a noise barrier on the west side of the facility.
  - If property is ultimately purchased for a self-haul recycle center at the North Station, consider enclosing the facility or providing berms or other barriers to reduce off-site noise impacts.
  - Monitor and evaluate noise complaints on an ongoing basis.
- For new recyclables processing facilities:
  - Consider requiring that new recyclables processing and manufacturing facilities be designed to reduce off-site noise impacts at any sensitive receptors if they are to qualify for economic development incentives.
- For centralized composting facilities:
  - Consider using performance specifications and submittal requirements for the upcoming bidding process for residential collection contracts to encourage yard and food waste facilities to be sited, designed, and operated in a manner that reduces noise impacts. For example, bidders could be required to submit information on site zoning and zoning of adjacent properties; location of off-site residences, hospitals, or other noise-sensitive facilities; site buffers; site traffic routing; the location of noisy operations such as chipping and grinding; noise control measures such as berms or barriers; and procedures to minimize noise impacts to workers.

2.4.6 Significant Unavoidable Adverse Impacts

Noise impacts can be somewhat mitigated by measures such as siting new facilities away from sensitive noise receptors or with extensive buffers, designing new facilities and facility modifications to include berms and noise barriers, and providing hearing protection to workers. However, even with these measures, some impacts to workers and the general public, especially at the North Recycling and Disposal Station, would be unavoidable and could, at times, be significant.

2.5 PUBLIC AND OCCUPATIONAL HEALTH RISKS

2.5.1 Affected Environment

This section discusses potential health risks associated with the Proposed Action and alternatives. These risks include those experienced by the general public as well by workers at facilities handling garbage, yard waste, food waste, recyclables, and/or special waste. Other sections of this EIS, such as **Sections 2.3, *Air* and 2.4, *Noise***, also evaluate topics that are related to health risks.

Two conditions are required for environmental health risks to exist. First, a potential health or safety hazard must exist. Second, individuals must be exposed to the hazard for a sufficiently long time and/or in a sufficiently large dose to result in an adverse health effect. Thus, in the absence of mitigation, health risks will be greatest in locations with the greatest potential for exposure and in areas with the highest population density. The Affected Environment for health risks, therefore, generally includes facilities that now accept or that could accept solid waste generated within the City of Seattle as well as neighborhoods and business areas immediately surrounding those facilities.

2.5.2 Impacts - No Action Alternative

Waste Reduction

The No Action Alternative would continue SPU's waste reduction programs. Programs that encourage less packaging, reuse, or grasscycling are not expected to cause health risks.

Attraction of Pests Due to On-Site Composting

On-site composting has the potential to attract pests such as rodents, flies, yellow jackets, and other insects. In practice, however, neither Seattle nor Vancouver, B.C. have received many complaints about insects or rodents due to backyard composting, and complaints they did receive were generally associated with food waste (Levinston, 1998; Moran, 1998; Quin, 1998**).** Seattle's backyard composting program encourages participants to use special bins for food waste composting. Follow-up visits in response to complaints regarding rodents often revealed that the bins were being used or installed incorrectly.

Collection

The No Action Alternative would continue current collection practices for garbage, yard waste, and recyclables. Currently, these materials are collected by separate trucks and delivered to the facilities described in **Section 1.2.1.** At certain times, up to three trucks could be collecting material in a given neighborhood in any one week, and in certain neighborhoods trucks may make more than one pass down a street. Potential safety hazards associated with collection would primarily result from the operation of collection trucks in neighborhoods and would be generally proportional to the total number of truck trips through a given neighborhood.

Transfer/Recycling Stations

Potential health hazards at transfer stations include safety hazards, primarily from the operation of trucks and heavy equipment and potential dangers from falls; exposure to dust and other irritants (See **Section 2.3.2, *Air***); fire; exposure to disease-carrying pests such as rats; and exposure to accidental releases of pathogenic or hazardous materials. Transfer station workers, commercial haulers, and self-haulers could be exposed to these hazards. However, because commercial haulers and self-haulers at the North Recycling and Disposal Station (North Station) and the South Recycling and Disposal Station (South Station) are at these facilities for a short period of time, risks are greatest for transfer station workers.

Although disposal of regulated hazardous and dangerous wastes at recycle stations is illegal, it is possible that individuals could dispose of small amounts of this material with their garbage, and that the materials would then be disposed of in the transfer building. Under certain conditions, this material could pose a health risk to employees or others in the immediate vicinity of the materials. Recently, however, there have been very few problems with dangerous or hazardous wastes inadvertently entering the buildings at Seattle's two transfer stations.

Yard Waste Composting

Potential health hazards associated with yard waste composting include safety hazards resulting from the operation of heavy equipment; rats, insects, and other pests; health effects from exposure to bioaerosols; and the potential for hazardous chemicals in the compost product.

Attraction of Pests

Although centralized yard waste composting facilities can attract rats and insects, these impacts can generally be controlled by quickly incorporating incoming materials into active composting piles. Yard waste composting facilities that also accept vegetative food waste may experience greater problems with rats and insects.

Bioaerosols

Bioaerosols are micro-organisms, spores, or microbial fragments entrained in dust particles or water droplets in the air. Bioaerosols containing the cell walls of certain bacteria and fungi and/or toxins produced by fungi can cause severe mucous membrane irritation and exacerbate allergies and asthma. One particular micro-organism, the fungus *Aspergillus fumigatus*, can also cause a lung infection termed Aspergillosis. This fungus occurs throughout the environment but generally does not cause disease except in individuals who have compromised immune systems (Thorn, et al, 1997).

Conditions at composting facilities, which can generate high levels of microbial activity and large amounts of suspended dust when compost piles are turned, can lead to the production and concentration of bioaerosols. Risks are greatest for workers who can be exposed to higher-than-ambient levels of bioaerosols for extended periods of time. The limited number of studies that have been conducted have not linked workers to increased incidences of lung disease. For example, a study that measured pulmonary function and chest X-rays of workers showed no changes before and after working in a sewage sludge composting facility, but the study did not evaluate long-term effects of prolonged exposure (Lees and Tockman, 1987).

Bioaerosol concentrations drop off dramatically with distance and are typically similar to ambient levels within 500 to 2500 feet of the source (Milner et al, 1994). A composting facility in Illinois conducted a major investigation into bioaerosols. Although the study showed off-site health risks to be minor, the site owner did restrict the amount of material that the facility could process (Pick, 1996).

Contaminants

Yard waste composting also has the potential to reintroduce insecticides, herbicides, and other garden chemicals back into the environment and potentially into food crops. Theoretically, certain chemicals that are typically not used on food crops could be reintroduced into the food chain via compost; however, regulations now ban chemicals, such as DDT, that do not break down over time in the environment. The content of potentially toxic organics in compost has been evaluated in studies conducted for Seattle (Herrera, 1992). The results indicate that some pesticides, polyaromatic hydrocarbons (PAH's), and polychlorinated biphenyls (PCB's) are detectable in compost product, but that generally, the composting process significantly reduces the concentration of these compounds to levels that do not exceed current regulations for protecting public health.

Analyses also indicate yard waste compost contains trace metals such as lead, zinc, and copper. However, trace metal concentrations are typically below the Washington Department of Ecology guideline standards for compost use. Elevated lead concentrations in compost have been attributed to the inclusion of soil with residential yard debris (Solid Waste Utility, 1994). Lead paint and atmospheric deposition from lead smelting and leaded gasoline usually are the cause of elevated lead levels in soils in urban environments (Seattle Solid Waste Utility, 1994).

Disposal

Long-Haul Transport and Disposal

With No Action and all other alternatives, Seattle would continue to transport its garbage via rail for disposal at the Columbia Ridge Landfill in Oregon. The major risk associated with long-haul transport would be the possibility of an accident. In addition to the typical problems caused by truck and train accidents, there would be some potential for the release of waste materials.

As with recycling stations, health risks from landfill disposal include those associated with heavy equipment, fire, pests, exposure to dust and other airborne irritants, and the accidental exposure to hazardous materials inadvertently disposed of with the garbage. Long-hauling garbage also could potentially result in non-native pests being introduced to the area surrounding the remote landfill. Additional health risks associated with landfilling include wind-borne litter and the potential release of landfill gas and leachate to the environment.

Landfill gas includes trace amounts of volatile chemicals such as benzene, tetrachloroethane, vinyl chloride, and toluene. Some of these chemicals are potentially carcinogenic. In addition, methane—the main ingredient in landfill gas—is flammable and potentially explosive if it is not collected or controlled. Landfill leachate can also contain carcinogenic chemicals and disease-causing organisms such as bacteria, fungi, viruses, and parasites.

The *1990 Seattle Waste Transport and Disposal Project Environmental Impact Statement*, which is incorporated by reference, concluded that the Seattle Waste and Disposal Contract would result in impacts to environmental health at the Columbia Ridge Landfill and Recycling Center similar to those described above and identified mitigation measures such as transportation of waste in closed containers, use of litter fences, composite liner, a leachate collection and removal system, pest control measures, landfill gas monitoring, and, if necessary, a landfill gas collection system. The location of the landfill in an arid, sparsely populated area also reduces environmental health risks.

Closed Landfills

Seattle's closed landfills, which are located in the City or in King County, also have the potential to generate landfill gas and leachate although the rate of gas and leachate production should decrease over time as the waste decomposes. Engineered covers and landfill gas control systems further reduce landfill gas risks from the Kent Highlands and Midway landfills.

Special Waste

Biomedical waste can contain human pathogens and has the potential to cause disease. To reduce the potential for spills, biomedical waste is transported and disposed of at specially permitted facilities. The potential for worker exposure to pathogens exists at these disposal facilities.

Seattle operates two household hazardous waste facilities. Employees would have the greatest risk of exposure at the City's household hazardous waste facilities because they work in close proximity to the collected wastes for extended times. Exposure could result from skin or eye contact, puncture, inhalation, or ingestion of household hazardous wastes. Activities that could result in worker exposure include: vehicle unloading, materials sorting, storage, packaging, and transport. Under normal working conditions, the likelihood of employee exposure would be minimal, provided proper operational procedures are followed. The greatest potential for exposure would be from a leak from a broken or improperly closed container during unloading and during packing the material for storage and transport. Except for latex paint, the City's household hazardous waste collection facilities have averaged about three spills per year. Spills have been less than one gallon and have all been successfully contained.

Customers delivering household hazardous waste would experience a lower risk of exposure than facility employees. The community surrounding these facilities would likely not be exposed in the event of a spill because of the small amount of material typically involved and the containment measures in place at the facilities. There would, however, be some risk of a spill resulting from an accident during shipping. Federal Department of

Transportation regulations require measures such as packaging, manifesting, and placarding vehicles to reduce the risks from accidents and to facilitate emergency response in the event of such a spill.

2.5.3 Additional Impacts of the Proposed Action

This section describes additional risks, compared to No Action, that could result from implementation of the Draft Plan's recommendations. In general, health risks for the Proposed Action would be similar to current practice (No Action). For example, to the extent that collection changes reduce the number of collection vehicles, health hazards associated with trucks operating on neighborhood streets would be proportionately reduced.

The Proposed Action could, however, lead to development of a new food waste processing facility, new recycling processing facilities, and a new self-sort recycling center including C&D debris recycling at the South Station. In addition, the Proposed Action could result in more than one yard waste composting facility processing yard waste generated within Seattle.

Modifications at Seattle's South Recycling and Disposal Station

Health risks associated with a new self-sort recycling center and C&D debris recycling would be similar to those at transfer stations, except that risks of injury from heavy equipment or from large trucks would be reduced because the recycling center would not be located within the transfer building. In addition, recyclables would not be as attractive to rats and insects. Removing recyclables from the transfer building would reduce congestion, thereby reducing safety risks to workers and customers.

New Recyclables Processing Facility

An additional health risk could be posed by construction of the new recycling center because the South Station site is located on part of an abandoned landfill, which was operated by the City of Seattle from approximately 1946 to 1966. The remainder of the site is owned by King County and private owners. The entire abandoned landfill site is listed as a confirmed hazardous substances site by the Department of Ecology. This means the site has been reported to the Department of Ecology and agency staff have done an initial investigation and have determined that further investigation is necessary.

Some health risks at recycling processors or manufacturers could also be similar to the new recycling center. Other health risks would be specific to the type of processing or manufacturing and could require additional site-specific and technology-specific environmental review.

New Food Waste Facilities

Health risks at transfer stations handling food waste would be similar to those at the stations handling garbage.

Without mitigation, rodents and insects could be a significant problem at a new food waste composting facility, especially if the new facility accepts meat, fish, and/or dairy products that are particularly attractive to rats and insects. Rapidly incorporating food waste into the compost mix and getting it up to composting temperature can reduce the potential to attract rodents and insects. Similarly, when compared to yard waste, food waste is also more likely to contain micro-organisms, such as *Salmonella*, which can cause human disease. Temperatures achieved in the composting process typically kill these bacteria. The potential for bioaerosols at a food waste composting facility would be similar to those for yard waste composting.

As discussed in **Section 1.2.2**, food waste processing would most likely employ composting (aerobic decomposition) but could also involve anaerobic digestion or conversion to animal feed. The fermentation and anaerobic digestion processes associated with these technologies occur in contained vessels, reducing the potential for bioaerosols relative to composting. Like yard waste composting, food waste compost could contain residual chemicals, such as pesticides, that were present in the composting feedstocks.

Yard waste/vegetative food waste co-composting facilities would be similar to those experienced at yard waste composting facilities, except that vegetative food wastes could be more attractive to pests.

Illegal Dumping

A variable can rate for yard waste is included in the Proposed Action to encourage on-site management of organics. A variable can rate could lead to illegal dumping. Illegal dumping can cause an environmental health risk by pollution of surface and ground water. In addition, illegal dumps can provide food and shelter for rodents and other pests that transmit disease.

2.5.4 Impacts from Alternatives to the Proposed Action

Many of the alternatives to the Proposed Action would have health risks similar to the Proposed Action and No Action alternatives. For example, impacts from co-collection or commingled collection of yard waste and vegetative food waste would be similar to impacts from yard waste and garbage collection. A pilot study of vegetative food waste collection conducted by Seattle indicated few problems with nuisance pests (Seattle Solid Waste Utility, 1994).

Health risks from a self-haul co-mingled material recovery facility at the South Station would be greater than at a self-haul recycle center because some self-haul garbage would be mixed in with the recyclables; however, self-haul garbage tends to contain less putrescible material than collected garbage. In addition heavy equipment such as dozers operating inside the building would present a safety risk. Workers at pick lines would also face health and safety risks from broken glass, hypodermic needles, and other sharps. To reduce these risks, workers could be required to wear masks, boots, and heavy gloves.

Health risks from food waste transfer at the North Station would be similar to those that would occur with food waste transfer at other transfer stations.

Bi-weekly garbage collection could increase the attractiveness of garbage to pests since odors would increase, and this impact could also be experienced at transfer stations. Coupling bi-weekly garbage collection with separate collection of food waste would reduce this impact somewhat.

2.5.5 Potential Mitigation Measures

Mitigation measures identified in **Section 2.3.5, *Air*** to mitigate air quality and odor impacts and **Section 2.9.5, *Water*** would also help reduce health risks resulting from the Proposed Action. Enforcement of local health department regulations regarding pest control will also help minimize the risks of disease. Additional mitigation could include:

- For transfer stations:
  - Continue training programs for workers at the North and South Stations, including programs focused on waste screening, health and safety, and emergency response.
  - Design new recycling center at the South Station to minimize excavation and potential exposure of construction workers to garbage.
- For composting facilities:
  - In the upcoming bidding process for residential collection and processing, require bidders to describe their health and safety programs including, for composting facilities, programs and measures to control bioaerosols such as water spraying at mixing and screening operations and all other areas where dust is generated.
  - For composting facilities, especially food waste facilities, require bidders to describe measures to protect food waste from disease vectors and how they will monitor and control pest problems on-site and at their property boundary.
  - Require composting facilities to prevent nuisance conditions or attraction of rodents or other vectors as stipulated in Title 10, the Code of the King County Board of Health.

- Periodically monitor compost products for pesticides, herbicides, and other potentially hazardous contaminants.

2.5.6 Significant Unavoidable Adverse Impacts

Mitigation measures—such as health and safety training, wearing protective clothing and equipment, controlling pests, and monitoring compost for traces of hazardous chemicals—can reduce the risks of handling and processing garbage, yard waste, food waste, and recyclables. However, because of heavy equipment and other conditions at transfer, processing, and disposal facilities, some risks, especially to workers, would be unavoidable.

2.6 LAND USE

2.6.1 Affected Environment

Existing Land Uses and Zoning

The City of Seattle owns and operates three major facilities within the City: the North Recycling and Disposal Station (North Station), the South Recycling and Disposal Station (South Station), and the Aurora Household Hazardous Waste Facility. Existing land uses and zoning near these facilities are described below.

- ***North Station.*** The North Station is located between the Fremont and Wallingford neighborhoods, north of Lake Union near Stone Way and approximately 2.5 miles north of the City's central business district. The area surrounding the station includes a mix of residential, commercial, industrial, and maritime land uses. Land uses north and northeast of the station are predominantly residential, with a balance of single family and multi-family housing.

  The North Station site is primarily zoned Industrial Commercial, with a 45-foot height restriction (IC-45) and a strip along the north of the site zoned Industrial Buffer (IB). The site is adjacent to public streets to the north (North 35th Street), east (Carr Place North), and south (North 34th Street). Single family homes line the north side of North 35th Street. These homes are located on lots zoned Single Family Residential (SF-5000). A property zoned Commercial with a 40-foot height restriction (C2-40), which formerly contained a commercial bakery, is located immediately east of the facility. Land uses south of North 34th Street and extending to the Lake Union shoreline include small maritime-related industries and commercial establishments; properties in this area generally are zoned Industrial Commercial (IC) and Commercial (C2). To the west, the North Station site directly abuts other properties zoned Industrial Commercial with 45-foot height restrictions (IC-45); these properties include commercial-industrial businesses and are oriented to Stone Way, a minor arterial running north-south.

- ***South Station.*** The South Station is located about 4.5 miles south of Seattle's central business district on property zoned Industrial General with a 65-foot height restriction (IG2-U/65). The site is due west of State Route 99, in an industrial area that runs along the west side of the Duwamish waterway. Surrounding land uses are predominantly industrial and are zoned Industrial General (IG1 or IG2) with specific height restrictions. A residential area, South Park, is located about one-quarter mile to the southeast, and the West Seattle - White Center hill is located about one quarter mile west of the site, beyond other industrial land uses bordering West Marginal Way Southwest.

- ***Aurora Household Hazardous Waste Facility.*** The Aurora Household Hazardous Waste Facility is open by appointment only. It is located about two blocks east of Aurora Avenue North between Stone Avenue North and Ashworth Avenue North and between North 125th Street and North 128th Street. The site is zoned Commercial 2 (C2). Properties to the north of North 128th Street and west of Stone Avenue North are also zoned C2. Properties to the west of Ashworth Avenue North are zoned Single Family Residential (SF 7200), and properties south of North 125th Street are zoned Commercial 1 (C1). Surrounding lands are residential and are zoned SF 7200.

Privately-owned Facilities. Major privately-owned facilities that handle garbage, yard waste, and/or recyclables generated in Seattle, either through contract with the City or within a competitive market, include the Eastmont Transfer Station, Recycle America Facility, Third and Lander Transfer and Recycling Station, and the Seattle Intermodal Facility, located in Seattle; the Cedar Grove Composting Facility, located in unincorporated King County, Washington; and the Columbia Ridge Landfill, located in Gilliam County, Oregon. Land uses and zoning in the immediate vicinity of these facilities are described below.

- **Third and Lander.** The Third and Lander Facility is located in a industrial area about 3.5 miles south of the Seattle central business district (see **Figures 1 and 8)**. Nearby land uses include warehouse and distribution businesses. The facility is located on property zoned Industrial General with a 85-foot height restriction (IG1-U/85). Properties immediately to the east, north, and south are also zoned IG1. Properties immediately to the west are zoned IG2 with 85-foot height restrictions.

- **Eastmont**. The Eastmont Transfer Station, which is on property zoned Industrial General (IG2), is located on West Marginal Way Southwest near the intersection with Detroit Avenue West and Highland Park Way Southwest (see **Figures 1 and 7)**. The Eastmont facility is located in the same general industrial area as the City's South Station, which is about one-half mile to the northwest. Surrounding lands are zoned Industrial General (IG2) to the north and to the east across West Marginal Way Southwest. Adjacent property immediately to the south is zoned Industrial Buffer (IB); farther south land is zoned Single-Family Residential (SF7200) and Industrial Buffer (IB). The West Seattle-White Center hill is located immediately to the west. Land within the Seattle City limits on top of the hill is generally zoned Single Family Residential (SF 7200).

- **Recycle America**. The Recycle America Facility is located on First Avenue South, about one-quarter mile from the City's South Station in the same general industrial area that also includes the Eastmont Station (see **Figures 1 and 7)**. The site is zoned Industrial General 2 with an 85-foot height restriction (IG2-U/85). State Route 509 runs adjacent to the eastern site boundary. Properties to the north are also zoned IG2; properties to the west are zoned Industrial Buffer (IB). Farther to the west properties are zoned SF 7200.

- **Seattle Intermodal Facility**. The Seattle Intermodal Facility (see **Figure 1)** is located on property zoned Industrial General (IG1) with an 85-foot height restriction. The rail yard is located north of South Dawson Street between Fourth Avenue South and Duwamish Avenue South. Properties surrounding this site are zoned Industrial General (IG1 or IG2) and support warehouse and railroad transportation-related business.

- **Cedar Grove Composting Facility**. The Cedar Grove Composting Facility is located in unincorporated King County north of Cedar Grove Road on property zoned Mining (M) (see **Figure 3)**. Surrounding uses include King County's Cedar Hills landfill and Stone Way Concrete. Properties to the north and west of the composting facility also are zoned Mining (M). Properties to the south and east of the composting facility are zoned Residential with a density of one dwelling per five acres.

- **Columbia Ridge Landfill and Recycling Center**. The Columbia Ridge Landfill and Recycling Center is located in Gilliam County Oregon (see **Figure 3)** on land zoned Exclusive Farm Use. Uses on the site—including landfilling, composting, recycling, and support facilities—are conducted within this zone under the authority of a Conditional Use Permit issued and enforced by Gilliam County. Uses on adjacent lands include livestock grazing, rangeland, and wheat and barley production.

Regulations, Plans, and Policies

Applicable regulations, plans, and policies include local zoning ordinances, land use plans, and shoreline master programs in areas where existing solid waste facilities are located; local zoning and plans in areas where new facilities could be sited; State minimum functional standards that apply to facility siting; and the State solid waste management planning hierarchy.

State Minimum Functional Standards and Solid Waste Management Hierarchy

As discussed in **Section 1.1.4**, Washington State has established a management hierarchy for solid waste that gives first priority to waste reduction, second priority to recycling, and third priority to landfilling or incineration. State minimum functional standards regulate certain aspects of solid waste facility siting. For example, the State standards require that the active areas of transfer stations must be no closer than 50 feet from the nearest residential property line. State standards do not establish similar restrictions for compost facilities.

Seattle Land Use and Zoning Code.

Facilities that could be sited within the City in response to the Draft Plan's recommendations or modifications to existing facilities that might be classified as a change in use are subject to the requirements of the Seattle land use and zoning code. Based on the Draft Plan's recommendations, the following types of facilities could be developed within the City: new privately-owned recyclables processing and manufacturing facilities; new privately-owned transfer stations; and, possibly, staging areas for collection technologies that do not require traditional transfer stations.

The Seattle land use and zoning code addresses allowable uses and performance standards in industrial, commercial, downtown, multi-family residential, and single-family residential zoning categories as well as critical areas and shoreline districts. Solid waste landfills are prohibited in all zones. Solid waste transfer stations and salvage yards are prohibited in all commercial and residential zones, but are permitted outright or allowed as conditional uses in certain industrial zones. Recycling centers, where recyclables are collected, stored, and/or processed, are allowed in all industrial zones and in some commercial zones. Recycling collection centers, where recyclables or second hand goods are collected in weather resistant containers, are potentially allowed in all zones with certain restrictions in residential zones. Specific uses related to solid waste management in the various zones are summarized in **Table 11.**

Sub-area planning districts throughout the City may have additional restrictions on solid waste facilities.

TABLE 11 - SUMMARY OF SOLID WASTE USES AND SEATTLE ZONING

Zone	Use			
	Recycling Center	Recycling Collection Station	Salvage Yard	Solid Waste Transfer Station
Industrial General 1 (IG1), Industrial General 2 (IG2)	P	P	P	ACU
Industrial Commercial (IC)	P	P	N	ACU
Industrial Buffer (IB)	P	P	N	N
Commercial 1 (C1), Commercial 2 (C2)	P	P	N	N
Neighborhood Commercial Zones (NC1, NC2, NC3)	N	P	N	N
Multi-family Residential	N	PA	N	N

Zones				
Single Family Residential	N	PD	N	N

ACU=Permitted as an Administrative Conditional Use
N=Prohibited
P=Permitted Outright
PA=Permitted as an Accessory Use to Institution or Public Facility
PD=May be Permitted as an Accessory Use to an Institution or Public Facility by Director of DCLU

1994 Seattle Comprehensive Plan

The 1994 Seattle Comprehensive Plan *Toward A Sustainable Seattle*, establishes goals and policies for managing growth within the City of Seattle for 20 years. The Comprehensive Plan specifically addresses land use (including shoreline use), transportation, housing, capital facilities, utilities, economic development, neighborhood planning, human development, and cultural resources.

Other Zoning and Comprehensive Plans

New private sector composting or food waste processing facilities developed in response to the Draft Plan's recommendations would most likely be sited in King, Pierce, or Snohomish counties. In addition, yard and food waste composting could occur at regional landfill sites such as the Columbia Ridge Landfill. In Washington, county comprehensive plans establish policies to achieve the goals and requirements of the State Growth Management Act. Provisions related to urban growth areas (areas where development is to be concentrated), protection of environmentally critical areas, and essential public facilities may influence where solid waste processing facilities are located.

Within King County, a centralized yard waste composting facility would be defined as a "yard or organic waste processing facility"—a particular type of "interim recycling facility." Yard or organic waste processing facilities are permitted outright in Agricultural, Mineral, Forest, Regional Business, and Industrial zones. In general, Agricultural, Mineral, and Forest zones are located outside of King County's urban growth boundary.

Within Pierce County, a private centralized food or yard waste composting facility over 40 cubic yards would be defined as a "level 2 organic waste processing facility" within the "utility use" category and would be permitted outright in Urban Industrial, Rural Commercial Center, and Agricultural zones; in Rural Residential and Forest zones, a central food or yard waste composting facility would be permitted as a conditional use.

The Snohomish County zoning code, Title 18 SCC, does not define composting facilities or uses.

2.6.2 Impacts—No Action Alternative

Changes in Land Use

Continuing existing practices would not result in land use changes, except at landfill disposal site(s), where land will be converted from agricultural or rangeland to active landfilling and closed landfill cells. For example, the *1990 Seattle Waste Transport and Disposal Project Final Environmental Impact Statement*, which is incorporated by reference, concluded that land use impacts at the Columbia Ridge Landfill would include the permanent conversion of about 50 acres to roads and other features, and the temporary conversion of about 800 acres for landfilling over the contract period. After closure, the land's value as rangeland or cropland could be decreased somewhat due to soil disturbance.

Zoning and Land Use Permits

Existing facilities have either received required land use permits or were permitted outright in their respective zones under zoning codes in effect at the time they were constructed. Therefore, some may be considered nonconforming uses while others may continue to be permitted outright even under new use provisions of

subsequent zoning codes. For example, the City's North and South Stations were permitted outright when they were developed. Because subsequent zoning code changes were adopted after these uses were originally established, administrative conditional use permits would be required to establish similar new uses or to expand or extend the existing uses by adding additional floor or yard areas to house or support what are currently non-conforming uses at either of these sites. The No Action Alternative would not, however, lead to a change in use, therefore, no new land use permit would be required.

Population growth and continued operation of the two stations, especially the North Station which is currently operating near capacity, would continue to result in off-site noise, odor, and traffic impacts as described in **Sections 2.4.2, 2.1.2, and 2.3.2**, respectively. Existing private stations within the City are located on lands zoned Industrial General, where transfer stations are allowed as administrative conditional uses. The Cedar Grove Composting Facility is located on land zoned Mineral, a Natural Resource zone where yard waste processing is permitted outright. Recent restrictions in the solid waste operating permit of the Cedar Grove Facility are in part intended to improve its compatibility with nearby residences (see **Section 2.3.2, *Air*)**.

Overall Consistency with Plans and Policies

The No Action Alternative would generally be consistent with the City's Comprehensive Plan goals and policies calling for utility service to be provided throughout the City and for waste reduction and cost-effective recycling. Unlike the Proposed Action, however, the No Action Alternative would not include new recycling programs that are marginally cost-effective. The No Action Alternative would also maintain different collection service between the north and south parts of the City, and would continue certain operations at the North Station that contribute to its operating near capacity. The Proposed Action recommends uniform collection frequency throughout the City and changes at the North Station, in part to achieve the equity and service reliability goals of the Comprehensive Plan.

2.6.3 Additional Impacts of the Proposed Action

Waste Reduction and Recycling

Except as discussed under **Section 2.3.3, *Air*** for on-site composting, proposed changes to Seattle's waste reduction programs are not expected to result in adverse land use impacts. Similarly, recommended recycling programs are not expected to result in adverse land use impacts except to the extent that modifications to existing facilities or new facilities are required as discussed below. Mandatory requirements for new multi-family construction to include space for recycling containers could require modification to the Seattle Land Use and Zoning and/or building codes.

Collection—Capacity Limits on Existing Land Use and Operating Permits

The Draft Plan's recommended process for rebidding collection contracts could reallocate the flow and types of materials received at public and private transfer stations within the City. Current solid waste operating permits issued by the Seattle-King County Health Department limit the amount of garbage that can be handled at the North and South Stations to 1000 tons per day (Jeff Neuner, 1998). Operating permits also limit the amount of garbage and construction and demolition (C&D) debris that can be handled at the Eastmont Station to 1950 tons per day. Third and Lander's permit limits the facility to 2050 tons per day for all materials except petroleum contaminated soils (personal communication, Hickock, Seattle-King County Department of Health, 1998). It is possible that reallocation of material among the transfer stations would result in one or more stations exceeding operating permit capacity, which would require permit modifications.

Processing and Transfer

All new facilities would have the potential to cause adverse aesthetic impacts such as glare from site lighting. Certain facilities may also be considered by some to be architecturally incompatible with surrounding buildings on properties due to height, bulk, and scale issues.

New Recyclables Processing and Transfer Facilities Within Seattle—Zoning

The Draft Plan recommends economic development incentives to encourage recyclables processing and manufacturing facilities to locate within Seattle. Under Title 23 of the Seattle Land Use and Zoning Code, a new recyclables processing facility could be classified as either a Recycling Center, or possibly as some type of manufacturing use depending on the specific type of operation. Under the current Seattle Land Use and Zoning Code, Recycling Centers are permitted outright in Industrial General (IG1 and IG2), Industrial Commercial (IC), Industrial Buffer (IB), and Commercial (C1 and C2) zones.

The Seattle zoning code groups manufacturing uses into light manufacturing, general manufacturing, and heavy manufacturing. Light manufacturing includes uses that typically have no or little potential for creating noise, dust, smoke, vibration, or other environmental impacts. Assembling items from parts made at another location is an example of light manufacturing. General manufacturing includes uses that typically have the potential for creating moderate noise, smoke, dust, vibration, or other environmental impacts. Producing items from metals, stone, concrete, or plastics are examples of general manufacturing uses. Heavy manufacturing uses typically have the potential for creating substantial environmental impacts and include uses such as quarrying, refining, metal extrusion, and municipal solid waste processing. Light manufacturing uses are permitted outright in certain Neighborhood Commercial zones (NC1 and NC2), all Commercial zones (C1 and C2), and all Industrial zones. General manufacturing uses are permitted outright in all Commercial and Industrial zones. Heavy manufacturing uses are prohibited in all Residential, Neighborhood Commercial, and Commercial zones; allowed as a conditional use in the Industrial Buffer and, under some circumstances, in Industrial Commercial and Industrial General zones; and in certain circumstances are permitted outright in Industrial General zones.

It is also possible that a new transfer station orintermodal facility could be proposed in response to the City's recommended process forrebidding commercial collection contracts. New transfer stations to handle garbage, food waste, and possibly yard waste would only be allowed in Industrial General and Industrial Commercial zones and would require an administrative conditional use permit (City of Seattle Land Use and Zoning Code, Chapter 23.50.012 and 23.50.014). Conditional use permits are only granted where permit restrictions can feasibly mitigate adverse off-site impacts. In addition, public benefits must outweigh the negative impacts of the use, and uses must be consistent with recommendations of Council-adopted neighborhood plans.

Mitigation requirements in conditional use permits typically involve items such as landscaping and screening and access controls. Specific requirements for solid waste transfer stations include:

- Design and operating measures to minimize odor and airborne pollutants developed in consultation with the Puget Sound Air Pollution Control Agency (PSAPCA)
- Transportation plan based on the probable impacts and/or scale of the proposed facility
- Measures to minimize other impacts incorporated into the design and operation of the facility

Improvements at North Recycling and Disposal Station and South Recycling and Disposal Station

The Draft Plan includes a number of recommendations for the City's South Station including a new self-haul recycle center, provisions for C&D debris recycling and yard waste transfer. It is also possible that a private hauler could propose food waste transfer at the South Station. Under Seattle's Land Use and Zoning Code (Title 23), a self-haul recycle center would be classified as a "recycling center" or "recyclables collection station" use. While the level of recycling may become more intensive as a result of the Draft Plan recommendations, these two uses are permitted outright in Industrial General zones, and an administrative conditional use permit probably would not be required. Other changes at the South Station, including C&D debris recycling, adding transfer of

curbside collected yard waste and possibly adding food waste transfer, and possible changes in the flow of materials, could require expansion or extension of structures or could be interpreted as an expansion of the existing non-conforming use that would require an administrative conditional use permit.

The Draft Plan's recommendations should reduce the amount of self-haul traffic, yard waste, and recyclables handled at the North Station, and thereby make the facility less disruptive to nearby residences. If adjacent property is purchased for enhanced recycling services, those services could be considered either a "recycling center" or "recycling collection station." Although permitted outright in Industrial (IB, IC, IG1, and IG2) and Commercial (C1 and C2) zones, these facilities would have to meet zoning code performance requirements to limit off-site impacts (City of Seattle Land Use and Zoning Code, Chapters 23.47 and 23.50). Mitigation to reduce off-site noise, air, traffic, and land use impacts from such a facility are identified in this EIS; certain mitigation measures are also required by provisions of the Seattle Land Use and Zoning Code.

New Composting Facilities

New privately owned and operated yard waste, yard waste/vegetative food waste, and/or food waste composting facilities could be developed in response to the Draft Plan's recommendations. If located in unincorporated King County, a new yard waste composting facility would be permitted outright in Agriculture, Mineral, Forest, Regional Business, and Industrial zones.

In Pierce County, both yard waste and food waste composting would be permitted outright in Urban Industrial, Rural Commercial Center, and Agricultural zones and as a conditional use in Rural Residential and Forest zones.

Commercial compost facilities are not defined in the Snohomish County Zoning Code, Title 18 SCC, and are not specifically listed in the use matrix of SCC 18.32.040 (A). When a use is not specifically listed in the use matrix, a determination is made whether the use closely fits a use that is listed in the matrix in accordance with SCC 18.14.030. If the proposed use closely fits a listed use, it is permitted by default only in the county's industrial zoning classifications. These classifications include Business Park (BP), Industrial Park (IP), Light Industrial (LI), and Heavy Industrial (HI) zones.

While new yard waste composting facilities would be allowed the King County zoning code (Title 21A) does not, however, specifically include food waste in its definition of a "yard or organic waste processing" facility. If a food waste composting or processing facility is considered a regional use, similar to a landfill or transfer station, a Special Use permit would be required. Alternatively, a code interpretation or revision could be requested to include food waste as a form of "organic waste," in which case a food waste composting facility would be permitted in certain zones.

The City of Seattle's Land Use and Zoning Code does not specifically provide a use classification for a composting operation. The Seattle Department of Construction and Land Use, (DCLU) has the authority to determine that a proposed use not identified in the Code is "substantially similar" to other uses permitted in a respective zone. DCLU has indicated that a composting operation would probably be classified as a "general manufacturing" use, which is permitted outright in C1 and C2 commercial zones and any of the City's Industrial Zones. However, a specific determination that the proposed use would be categorized as "general manufacturing" would require DCLU review of the specific project proposal.

Non-Traditional Technologies

The Draft Plan's recommendations forrebidding residential collection contracts could also lead to proposals for new collection technologies that do not require traditional transfer stations but do require staging areas for temporarily storing empty and enclosed containers. For such a system to be cost-effective, staging areas would be required near areas where material is collected. The Seattle Land Use and Zoning Code does not explicitly address this type of use. If considered a "cargo terminal" they could be allowed as special uses in C1 zones, as Council conditional uses in C2 zones, and permitted outright in all industrial zones (City of Seattle Land Use and Zoning Code, Chapter 23.47.004). Alternatively, they could be considered transfer stations, or a code revision could be required.

Overall Consistency with Plans and Policies

Seattle's 1994 Comprehensive Plan establishes goals and policies for utility service, including solid waste, within the City. **Table 12** summarizes the consistency of various elements included in the Draft Plan's recommendations with applicable utility goals and policies. In addition, certain goals and policies related to land use, capital facilities, economic development, and human development may also apply to the Draft Plan's recommendations. For example, certain economic development goals and policies strive to support small businesses. The Draft Plan's recommendations to provide curbside recyclables collection at no cost to small businesses would be consistent with these policies and goals. Siting new facilities would also be influenced by Comprehensive Plan policies that encourage industrial/manufacturing centers, recommend preventing incompatible activities from locating in close proximity to each other, and stress equitable distribution of facilities. The Human Development Element of 1994 Comprehensive Plan also stresses collaborative programs and service delivery between City departments, equitable siting of facilities, and effective use of existing facilities.

TABLE 12 - CONSISTENCY WITH COMPREHENSIVE PLAN - UTILITY ELEMENT

Comprehensive Plan Goal or Policy	Relationship to the Proposed Action
G1 - Provide reliable service at lowest cost consistent with the City's aims of environmental stewardship, social equity, and economic development.	Overall the Draft Plan's recommendations are aimed at providing reliable service at low cost. Specific items, such as the recommended process for rebidding residential collection contracts, are aimed at improving system efficiency. Changes in collection frequency are aimed at providing uniform service throughout the City, in part to achieve social equity. Incentives for recyclables processors and manufacturers to locate within Seattle would promote economic development.
G2 - Maintain the service reliability of the City's infrastructure.	Improvements at City transfer stations and reallocation of certain functions from the North Station to the South Station are designed in part to maintain the service reliability of the two stations.
G3 - Maximize the efficient use of resources by utility customers.	Waste reduction and recycling programs are aimed at efficient resource use. Improving collection system efficiency could also reduce the use of energy for transportation.

TABLE 12 - CONSISTENCY WITH COMPREHENSIVE PLAN - UTILITY ELEMENT (CONTINUED)

Comprehensive Plan Goal or Policy	Relationship to the Proposed Action
U1 - Continue to provide service to existing and new customers in all areas of the city consistent with the legal obligation to provide service.	Draft Plan recommendations would provide service throughout the City either directly by SPU, through contracts, or through services provided directly by the private sector.
U3 - Maintain the reliability of the City's infrastructure as the first priority for utility capital expenditures; and U4 - Continue to provide for critical maintenance of and remedying existing deficiencies in City utility capital facilities.	Completion of seismic upgrades has been given top priority**.** Improvements at the South Station should help maintain the reliability of the City's overall system by relieving pressures on the North Station.
U7 - Promote environmental stewardship in meeting City utility service needs and encourage the efficient use of resources by utility customers.	See analysis of Goal 3. Mitigation identified in this EIS would further promote environmental stewardship.
U10 - Encourage waste reduction and cost-effective reuse and recycling through	Draft Plan recommends increases in waste reduction and cost-effective recycling, but does not recommend collecting materials or

Comprehensive Plan Goal or Policy	Relationship to the Proposed Action
appropriate policies and programs.	implementing programs that are not cost effective. For example, the Draft Plan recommends that the City obtain prices for residential food waste collection and processing. The City would consider these prices when deciding whether or not to provide this service.
U11 - Work with neighborhood and community representatives in siting utility facilities.	Mitigation identified in this section of the EIS includes working with neighbors in the vicinity of the South and North Stations regarding the development or enhancement of recycling services. In addition, the City could require that proposals for residential collection and processing address how the surrounding community would be involved in siting new facilities or modifications to existing facilities if they are proposed.
U12 - Continue to subject all above-grade capital improvement projects to review by the Seattle Design Commission.	Mitigation identified in this section of the EIS addresses this issue.
U15 - Promote the City's goals of environmental stewardship, social equity, and economic development in the operation of non-City utilities providing service in Seattle.	Draft Plan is based on a number of services being provided through contract with private companies. The Plan's recommended collection frequency would address social equity by requiring haulers to provide uniform service throughout the City.

2.6.4 Impacts from Alternatives to the Proposed Action

Overall Consistency with Plans and Policies

Certain alternatives to the Proposed Action, such as a self-haul material recovery facility at the South Station as well as mandatory participation and material bans, may not be consistent with the cost-effectiveness goals and policies contained in Seattle's 1994 Comprehensive Plan. A grass ban would be consistent with the Comprehensive Plan's cost-effectiveness goals and policies because it would likely lead to increased on-site management, which is more cost-effective than yard waste collection and centralized composting. Studies conducted by Seattle indicate that a self-haul material recovery facility would be less cost-effective than the proposed self-haul recycling center (R.W. Beck, 1995). Mandatory separation of materials such as styrofoam and food waste may not be cost-effective.

Yard Waste/Food Waste Transfer at the City's North Station

Although yard waste transfer currently occurs at the North Station, food waste transfer would be considered an expanded use, possibly requiring an administrative conditional use permit.

Material Recovery Facility at the South Recycling and Disposal Station

A material recovery facility at the South Station may be considered a "recycling center" use, which includes processing and is permitted outright in Industrial General Zones. Therefore, it is likely that new discretionary land use approvals would not be required. Building permits would, however, be needed.

Modifications to Land Use Codes

Certain alternatives, such as mandatory construction site recycling could require modifications to Seattle's Land Use or Building Codes.

2.6.5 Potential Mitigation Measures

Mitigation measures identified for noise, air, and traffic would in part improve the compatibility of new facilities with adjacent uses. Other mitigation includes landscaping and design of site lighting to avoid off-site glare.

To the extent that new recycling processing facilities are located in industrial areas, they would be compatible with goals and policies in Seattle's Comprehensive Plan that call for centralized industrial areas and new jobs and economic growth in manufacturing. Additional mitigation could include requiring developers to provide landscape and architectural drawings and specifications for City review if they are to qualify for economic development incentives. New specialized private-sector transfer stations, if proposed, would be consistent with the Comprehensive Plan's goals and policies provided they are sited in industrial areas and designed and operated in a manner that effectively mitigates off-site impacts. To achieve the intent of the siting goals and policies in the Comprehensive Plan, the City could request bidders on its residential collection contracts to submit information on selected sites and on their proposed process for involving nearby neighborhoods in their siting process.

Changes at the City's North Station are designed to reduce off-site impacts resulting from the operation of that station. If nearby lands are purchased for enhanced recycling services, special attention should be paid to ensure that a recyclables collection facility does not result in significant adverse off-site noise impacts, especially to residential properties located to the north and east of the station. Mitigation to address traffic, noise, and air impacts of changes at the South Station are identified elsewhere in this EIS. Review of facility designs by the Seattle Design Commission will provide further assurance that facilities are compatible with surrounding areas.

New food waste composting or processing facilities have the potential for significant off-site odor impacts. Proper siting and appropriately sized buffers are critical factors in determining the compatibility of such facilities with adjacent land uses.

2.6.6 Significant Unavoidable Adverse Impacts

If properly sited, designed and operated, new facilities should be compatible with nearby land uses. In certain circumstances, however, adverse land use impacts could be unavoidable. The actual extent of land use impacts would be site specific.

2.7 PUBLIC SERVICES AND UTILITIES

2.7.1 Affected Environment

Facilities that handle garbage, yard waste, and recyclables require utility service such as electric service for lighting and to power equipment such as pumps, blowers, conveyors, and compactors; water service for cleaning areas where waste is handled and for fire suppression; and sewer service and/or wastewater treatment to collect and treat contaminated wash water andleachate. These facilities can also require emergency services such as fire fighting and hazardous material spill response.

Services in Seattle

Within the City of Seattle, the following utilities and public service agencies provide services:

- **Electricity.** Seattle City Light (SCL), which is publicly owned and operated, provides electric service throughout Seattle
- **Water.** Seattle Public Utilities (SPU) provides water to households, businesses and institutions within Seattle. The utility owns its own sources of supply, major transmission pipelines, and the local distribution system within the City.
- **Sewer**. SPU also provides sewer service within Seattle. Almost all areas of the City are served by sanitary sewer; a few small areas use septic tanks. Three types of systems are used in Seattle: combined sanitary/stormwater sewer, partially separated sanitary/stormwater sewer, and separate sanitary and stormwater sewer. The SPU sewer system collects wastewater and delivers it to interceptor lines, pump stations, and wastewater treatment plants owned and operated by King County.
- **Solid Waste**. SPU also implements policies and provides services related to solid waste management for the City of Seattle. The analysis of impacts and mitigation in this section discusses the effects that the Proposed Action is expected to have on SPU's delivery of solid waste services.
- **Fire Protection and Emergency Response.** The Seattle Fire Department provides fire protection and emergency medical services and responds to hazardous materials incidents throughout the City from 33 fire stations and Harborview Medical Center.

Services in King, Pierce, and Snohomish Counties

Within King, Pierce, and Snohomish counties, where existing and new composting facilities are or could be located, organizations providing utility service include:

- **Electricity**. Much of the area potentially affected by the 1998 Plan within King and Pierce counties is served by Puget Sound Energy (PSE), an investor-owned utility. Some portions of King County, immediately north and south of the Seattle City limits, are served by SCL. Portions of unincorporated Pierce County are served by ten electric purveyors while Tacoma City Light and three other municipally-owned utilities provide electric service inside their respective city limits. The Snohomish County Public Utility District provides electricity to all of Snohomish County.
- **Water**. SPU sells wholesale water to more than two dozen suburban water districts, municipalities, and non-profit water associations that provide retail water service in most of King County and a small part of southwest Snohomish County. The City of Everett provides water to over 400,000 of Snohomish County's

550,000 residents. The City of Tacoma supplies water to about 37 percent of Pierce County's population; water service is also provided by approximately 1,400 public water purveyors. Wells also serve as a source of water supply to private water companies, individual businesses, and homes in King, Pierce and Snohomish counties.

- **Sewer.** Wastewater generated within King County is collected by public sewers and conveyed to wastewater treatment plants or is treated in on-site septic systems. Over time, sewer service should extend to all areas in King County within the Urban Growth Area since this service is required for most new developments in that area (see **Section 2.6., *Land Use***).

  Within Pierce County, sewer service is provided by a number of municipalities or sewage agencies whose service areas each occupy a portion of one of four sewage drainage basins defined by the County. On-site sewage disposal systems, such as septic tanks, also exist in each of these basins. Within Snohomish County, sewer service is provided by a number of municipalities, sewage agencies, and on-site disposal systems.

- **Wastewater Treatment.** King County provides wholesale wastewater treatment and disposal service to Seattle, 16 other cities and 18 local sewer/water districts. Wastewater is treated at the Renton and West Point Sewage Treatment Plant before being discharged to Puget Sound. The existing system is estimated to reach capacity in 2010. Therefore, a regional wastewater service plan calls for a new treatment plant in north King County or south Snohomish County. Two other wastewater plants, Alki and Carkeek, are being converted to treat only combined stormwater/wastewater overflows. In Snohomish County, wastewater treatment is provided by King County, the City of Everett, and several local sewage treatment facilities. In Pierce County, municipal wastewater treatment plants serve four sewage drainage basins designated within the County.

Services in Eastern Oregon

Rural areas of Eastern Oregon generally have on-site water supply, wastewater treatment, and disposal systems. Other utilities and public services such as electricity, solid waste, and fire protection are generally provided to meet the needs of the rural citizens they serve. For example, the sewer system and fire protection services are located about 10 miles north of the Columbia Ridge Landfill in Arlington, Oregon. Two water wells are located on the landfill site.

2.7.2 Impacts - No Action Alternative

The No Action Alternative would continue SPU's waste reduction, collection, recycling, transfer, disposal, and special waste programs. Flow of materials to major facilities is described in **Section 1.2.1.** Some material generated in Seattle may flow to facilities outside of the City's system. For example, studies conducted by King County indicate about 80 percent of self-haul loads at the County's First Northeast Transfer Station, located in the City of Shoreline, originate in Shoreline or Seattle. This flow was prior to a rate increase by King County which likely shifted some Seattle self-haulers back to the City's North Station. Over the 20-year period covered by the Draft Plan, the amount of garbage, yard waste, and recyclables handled within Seattle's solid waste management system would increase as Seattle's population and level of business activity grows. For example, SPU estimates that the amount of garbage requiring disposal could increase from 446,000 tons per year in 1995 to between 500,000 and 570,000 tons per year by 2014, depending on the forecast assumptions.

Growth Impacts at the North Recycling and Disposal Station

Overall, growth will place increased pressures on all utility and emergency services provided by the City. Impacts resulting from a projected increase in garbage and yard waste would be most noticeable within Seattle's solid waste utility, specifically at the North Recycling and Disposal Station, which is already operating near capacity.

Specific growth-related impacts could include increased on and off-site queuing as well as increased congestion within the transfer building.

Limited Capacity for Yard Waste Composting

Seattle's yard waste collection program could also experience service impacts due to the combined effects of increases in the amount of yard waste requiring collection and capacity restrictions placed on the operating permit for the Cedar Grove Composting Facility, which currently processes all of Seattle's yard waste. New permit restrictions will limit the amount of material accepted at Cedar Grove to no more than 13,000 to 15,000 tons per month from April through July. Depending on the specific month, this is about a 37 to 50 percent reduction compared to the amounts received in 1997. The possibility and severity of a service impact to Seattle would depend on the ability of the facility owner to shift yard waste currently received at Cedar Grove to other facilities. In 1998, Cedar Grove is diverting yard waste from Seattle and other sources to other composting facilities including Pacific Topsoils in Snohomish County.

Composting facilities currently permitted in King, Pierce and Snohomish counties do not have enough permitted capacity to handle yard waste produced during peak months in wet years (based on 1996 and 1997 actual tonnages). During wet years, it appears the capacity shortage could be up to 220 tons per day in a peak month. During normal years, SPU estimates there would be no capacity shortage if yard waste can be successfully redistributed among existing facilities. Growth and new customers would worsen the problem if no new facilities are permitted (Regional Yard Waste Processing Work Group Draft Report, 1998). The composting facility at the Columbia Ridge Landfill, together with existing facilities in the Puget Sound Region, would have adequate capacity to meet Puget Sound regional needs.

Disposal

The *1990 Seattle Waste Transport and Disposal Project Final Environmental Impact Statement*, which is incorporated by reference, concluded that the Seattle Waste and Disposal Contract would increase the demand for housing and related public services due to an increase in employees at the landfill. Impacts would be minimized by recruiting qualified personnel from Gilliam County workforce to fill new landfill jobs. Increased amounts of garbage requiring disposal over the life of Seattle's contract are accounted for in site development plans for the Columbia Ridge Landfill.

Special Waste

Growth associated with the No Action Alternative would increase the amount of material delivered to Seattle's household hazardous waste facilities, but the two existing facilities have the necessary capacity to accommodate these increases.

2.7.3 Additional Impacts of the Proposed Action

This section describes additional impacts to public services and utilities, compared to No Action, that could result from implementing the Draft Plan's recommendations.

Waste Reduction and Recycling

Many of the recommended waste reduction and recycling programs should not increase the demand for utility or public services at existing facilities. The recommended variable can rate for yard waste could increase illegal dumping, which in turn would increase the need for education by SPU and enforcement by the Seattle-King County Health Department.

Increased grasscycling and on-site composting would, however reduce Seattle's annual demand for centralized yard waste composting compared to No Action. Reducing the amount of yard waste collected and shifting yard waste transfer to Seattle's South Recycling and Disposal Station would help alleviate operational problems at Seattle's North Station by reducing traffic and freeing up an unloading bay. Other recommended recycling programs are not

expected to adversely affect utility and public services except to the extent that new facilities or facility modifications are required. These impacts are discussed under *Transfer and Processing*, below.

Changes in Residential Collection Service

The Draft Plan recommends changing current collection frequencies for recyclables and yard waste so a uniform level of collection service is provided citywide. Specifically, the Draft Plan recommends changing to every-other-week collection for recyclables and yard waste, except in the winter when yard waste would be collected monthly. In addition, the Draft Plan recommends that the City implement collection of commingled recyclables throughout the City.

These recommendations would reduce the frequency of recyclables north of the Ship Canal and increase the frequency south of the Ship Canal. In addition, residential customers north of the Ship Canal could be asked to change from segregating their recyclables to using commingled recycling containers. Residential customers north of Yesler would also have less frequent yard waste collection service from March through November. Although reactions to these changes in service will vary, it is likely that SPU will experience increases in customer questions and complaints as it transitions to the new levels of service.

Implementing residential commingled collection throughout the City would also require changes to recyclables processing facilities and to collection fleets that currently collect source segregated recyclables.

If separate food waste collection is implemented, special containers could be required. A pilot study conducted by Seattle examined the feasibility of curbside vegetative waste collection. The pilot study demonstrated that the participants could adequately distinguish between vegetative and non-vegetative food waste and indicated there were few problems with odor and pests (Seattle Solid Waste Utility, 1995).

Transfer and Processing

Changes at Seattle's North and South Recycling and Disposal Stations. The Draft Plan recommends construction of a new self-haul recycling center at the South Station coupled with rate incentives to encourage self-haul customers to use that station. SPU estimates that these recommendations would shift about one-third of its self-haul customers from the North Station to the South Station. This change would reduce off-site queuing and congestion inside the transfer building at the North Station and could degrade weekend service at the South Station (see **Section 2.2.3, *Transportation***). Shifting yard waste transfer from the North Station to the South Station would further benefit operations at the North Station.

One possible outcome of the Draft Plan's recommended process for rebidding collection contracts would be a proposal to modify private stations or the City's South Station for food waste transfer. This would require the purchase of dedicated, leak-proof trailers. Reducing the moisture content of food waste would result in fewer trips between the transfer station and processing site. Simple drainage would likely be used to reduce moisture content; therefore, facility modifications would also require an area for draining excess liquids with a connection to the sewer system.

New Transfer and Recyclables Processing Facilities. The Draft Plan also recommends that Seattle provide incentives for new recyclables processing facilities to locate within Seattle. In addition, the Plan's recommended process for rebidding the City's residential collection contracts could lead to the development of new specialized transfer stations, such as facilities for food waste transfer, in the City. These types of new facilities would most likely be sited in industrial or, possibly, commercial, areas and would require electric, water, and sewer service. For example, required fire flows of about 1,000 ton per day at a new transfer station would be around 2,000 gallons per minute. Potentially, new utility service for this type of use would require modifications to existing utility infrastructure. As a result, modifications to the local water distribution system could include installation of new water mains, valves, and/or fire hydrants.

Another possible outcome of the Draft Plan's recommended bidding process would be for a private hauler to propose taking material to a transfer station located outside of the City limits, such as King County's First Northeast Transfer Station in the City of Shoreline. Computer modeling by SPU suggests that about 20 collection

trucks (resulting in 40 average daily trips) would, on a typical day, reduce travel times if they delivered materials to the First Northeast Transfer Station rather than to the City of Seattle's North Station.

First Northeast generated approximately 254,000 trips in 1994; average daily trips included about 650 trips from cars and small trucks, 34 trips from large collection trucks, and 22 trips from large transfer trucks. Regional growth is expected to increase annual traffic to between 290,000 and 355,000 trips, for a total of about 820 trips from cars and small trucks, 42 trips from large collection trucks, and 28 trips from large transfer trucks. Under optimal travel time assumptions, in 2010, Seattle waste would add approximately 40 trips from large collection trucks on an average day. This would represent a relatively small increase in overall traffic at the facility but a more substantial increase in the large truck traffic.

An assessment of the First Northeast Station conducted in 1994 (King County Solid Waste Division, 1994) identified a number of operational issues at the station. For example, narrow stall widths and the placement of columns inside the transfer building interfere with vehicle unloading and may reduce peak throughput of the facility. The method used for compacting loads also achieves lighter than desired payloads in transfer trailers. In addition, on-site traffic circulation patterns are complex and traffic queues occasionally extend off-site. The 1994 report identified additional issues related to utilities,stormwater, foundation conditions, building structures and other issues. It is likely that any proposal to use the First Northeast Transfer Station for a portion of Seattle's waste would not be acceptable to Shoreline or King County until mitigation to address existing problems is complete. Such a proposal could also result in requirements for additional environmental review by either Shoreline or the County.

New or Expanded Composting Facilities. The Draft Plan recommends technical assistance incentives to help the private sector develop a new food waste composting facility. In addition, the Plan recommends that Seattle request prices for food waste collection and processing and for vegetative food waste/yard waste co-collection and processing. These recommendations could lead to expansion of existing yard waste composting facilities and siting of new facilities.

Currently few facilities in Western Washington are permitted to accept commingled yard waste and vegetative food waste. Although Cedar Grove is permitted to take pre-consumer vegetative food waste from businesses, it is unlikely the facility would be able to accommodate vegetative food waste from Seattle because of capacity restrictions recently placed on its permit. The Columbia Ridge Landfill and Recycling Center near Arlington, Oregon is permitted for composting of both yard and food waste. In addition, Land Recovery, Inc. is in the process of developing a facility that will accept both pre- and post-consumer food waste at its Hidden Valley Landfill in Pierce County. The facility is permitted and expected to be operating by the end of 1998.

New composting facilities would most likely be sited in rural areas, away from population centers. Electricity would likely be available near all locations, but new distribution lines could be required. Depending on location, water service may be available, or on-site wells would have to be developed (se**Section 2.9, *Water***). Some of these areas do not now and are not likely to have sewer service in the future. (For example, King County's Growth Management Plan does not allow public sewer expansion in Rural or Natural Resource zoning districts except where needed to address specific health and safety problems.) New facilities located in these areas would most likely have to develop on-site systems for handling, treating, and disposing of contaminated water.

Alternative Technologies. Another possible outcome of the Proposed Action for collection would be for Seattle to conclude that residential food waste collection and processing would not be as cost effective as continuing to dispose of food waste with garbage or to dispose of it through garbage disposals and into the sewer. Increasing the amount of food waste disposed of through the sewer can impact utility service in five basic ways: by causing operational problems at pump stations such as clogging and increased odor generation; by contributing to capacity problems; by upsetting individual unit processes at wastewater treatment plants; by changing the quality of biosolids; and by increasing the amount ofbiosolids generated.

In 1995, the King County Department of Natural Resources (formerly Metro) conducted a study to evaluate the disposal of food waste to the wastewater system (King County Department of Natural Resources, 1995). The study concluded that food waste increases suspended solids and biological oxygen demand (BOD) and affects biosolids quality by increasing the nutrient content and diluting the trace metal content. The impact of increased

suspended solids and BOD loading on individual unit processes could include, for example, increased loading on the primary settling basins and increased production of primary sludge.

As discussed under *Affected Environment*, above, King County estimates that a new wastewater treatment plant will be required in north Seattle or south Snohomish County by 2010. Until shortly before that date, wastewater treatment capacity would be adequate to accommodate increased disposal of food waste through the sanitary sewer system although adjustments to individual unit processes could be required. The cost-effectiveness of continuing this practice on a large scale after 2010 would have to be re-evaluated after new facility costs are better defined.

Another alternative technology that could be proposed is a collection system that eliminates the need for a transfer station for unconsolidated garbage, yard waste, and/or food waste. Instead of a traditional transfer station, such a system would use staging areas located throughout Seattle for storing full and empty containers. These staging areas would have to provide adequate space for vehicle maneuvering and may need drainage improvements, lighting, and possibly connections to the sanitary sewer system. Containers delivered for intermodel transfer may not meet the weight requirements in the City's long-haul contract and would necessitate a contract amendment.

2.7.4 Impacts from Alternatives to the Proposed Action

Other alternatives with the potential to affect utility and public services include mandatory participation in recycling programs, a ban on food waste, a grass ban, bi-weekly garbage collection, development of a self-haul commingled material recovery facility at Seattle's South Station, and yard waste/food waste transfer at the City's North Station.

Mandatory participation in recycling programs would reduce the amount of garbage requiring disposal by 25 to 40 percent, compared to No Action. Mandatory recycling would also increase the demand for processing facilities for recyclables, and these facilities would require utility service.

A ban on food waste in garbage could increase the demand for food waste composting, could result in additional material being disposed of in the sanitary sewer, and could lead to illegal dumping. A grass ban would significantly relieve the demand for centralized yard waste but could be more likely to lead to illegal dumping than a variable can rate for residential yard waste collection. Bi-weekly garbage collection would reduce the level of collection service throughout the City and would require modification to Seattle-King County Health Department regulations.

A self-haul material recovery facility at the South Station site would require utility service including electric power, water, and sewer. Yard waste/food waste transfer at the North Station could necessitate modifications to drain liquids from food waste to the sewer system.

2.7.5 Potential Mitigation Measures

Actions recommended in the Draft Plan are designed, in part, to mitigate adverse impacts related to the operation of Seattle's solid waste utility. For example, several of the recommended changes are designed to improve operations at the City's North Recycling and Disposal Station; the recommended bidding process for residential collection contracts is designed to increase the efficiency and equity of collection services within the City; and waste reduction and recycling recommendations will partially offset the effects of growth. In addition, a regional work group has identified a number of measures to help alleviate the shortage in regional composting capacity. These measures include: developing agreements between various composters and yard waste haulers, hauling yard waste to the Columbia Ridge Landfill and Recycling Center's composting site, expanding grasscycling promotions, initiating land application projects, and developing a contingency plan.

Utility service required at new facilities would be site specific and will depend on the types of services available in the area where new facilities are located. For example, if sewer service is unavailable, new composting facilities would have to be sited in areas with soils that are suitable for on-site wastewater disposal.

If prices obtained for food waste collection and processing suggest that the best strategy is to encourage disposal of food waste in the sanitary sewer system, additional studies and consultation with King County may be needed to determine what capacity improvements might be required.

2.7.6 Significant Unavoidable Adverse Impacts

All facilities handling garbage, food waste, yard waste, and recyclables create some level of unavoidable demand for utilities and public services. Utility service should be available for all new facilities and facility modifications located in the City of Seattle. In more rural areas, where new private composting facilities are most likely to be sited, sanitary sewer service and public water supply may not be available and on-site systems such as septic tanks and wells would have to be employed. In addition, fire fighting and emergency response services may need to be supplemented with on-site capabilities.

2.8 EARTH

2.8.1 Affected Environment

Overall, the affected environment for earth encompasses two distinct regions with markedly different geologies: the Puget Sound region, including Seattle and King, Pierce, and Snohomish counties; and the Columbia River basin, including eastern Oregon.

Geology and Soils in the Puget Sound Region

Puget Sound regional geology generally consists of alternating layers of glacial deposits overlying volcanic and sedimentary bedrock formed between 65 million and two million years ago. Glacial material was deposited over bedrock at least four times between 1.5 million to 10,000 years ago. Topography and soils in the Puget Sound region reflect the effects of the most recent glacial period, which ended about 13,000 years ago. For example, topography is dominated by several major north-south drainages, such as Puget Sound, Lake Washington, and Lake Sammamish, separated by ridges and plateaus. The orientation of these drainages reflects the direction of the glacial advance and retreat.

Many areas in the Puget Sound region have surface or subsurface layers of glacial till, a dense, compact, low-permeability soil that was deposited by glacial ice and compacted by the weight of the overlying glacier. Outwash soils, which were deposited as the last glacier retreated and therefore not compacted by glacial ice, typically consist of unconsolidated silts, sands, and gravels. Alluvial soils deposited by rivers include poorly-drained soils, such as silt loams, and well-drained sandy and gravelly sandy loams. Soils with a high organic content are scattered throughout both areas.

Geologic hazards in the Puget Sound region include region-wide risks from earthquakes and location-specific issues such as steep slopes, erosion hazard areas, seismic hazard areas (soils that "liquefy" during earthquakes), and abandoned mines. In the Seattle-King County area, sensitive areas ordinances and building code restrictions limit the type of development that can occur in geologic hazard areas. As discussed in **Section 1.1.4,** regulations issued under RCRA Subtitle D and Washington State Criteria for Municipal Solid Waste Landfills include restrictions on siting landfills in areas with unsuitable geology.

Columbia Basin Geology

In contrast to the Puget Sound region, geology at the Columbia Ridge Landfill is typical of the Columbia River Basin east of the Cascade Mountains. This area is underlain by Columbia River basalts, which were deposited by lava flows occurring between 17 and 6 million years ago. These lava flows are overlain by gravel, sand, silt , and clay sediments. A top layer of fine sand and silt was deposited by wind less then 12,000 years ago. This layer is very susceptible to erosion and in places can be very shallow.

2.8.2 Impacts—No Action Alternative

The No Action Alternative would continue Seattle's existing waste reduction, recycling, processing, transfer, disposal, and special waste programs.

Waste Reduction and Recycling

In general, continuing waste reduction programs that encourage sustainable building practices, less packaging, and reduced paper use would not have an adverse effect on earth resources but could reduce the impacts of littering somewhat. Grasscycling and on-site composting should benefit soils where they are applied although there would be some potential for garden chemicals, such as pesticides and herbicides, to be reintroduced into the soil.

Similarly, recycling programs (except composting as discussed below) should not have adverse impacts on earth resources.

Collection, Transfer, and Processing

Earth impacts associated with the construction of processing and transfer facilities include increased erosion as well as the need to import fill or dispose of excess excavated material. These construction impacts are typically short-lived and therefore are not a problem at existing recycling and transfer stations. At times, minor repair and construction projects at existing facilities could create short-term erosion impacts, but these impacts would be limited in area.

Potential impacts associated with the ongoing operation of transfer and recyclables processing facilities include risks associated with earthquakes and the potential for limited soil contamination from a spill of fuel, lubricants, or other hazardous materials. Spills could also occur along collection routes. Seattle is currently implementing seismic upgrades at its existing stations and has spill response plans in place to reduce the impacts of such events.

The No Action Alternative would continue centralized composting of yard waste (currently at Cedar Grove Composting). Impacts at the centralized compost facility itself would include some potential for erosion in graded areas and from compost piles as well as the potential for localized soil contamination due to leachate escaping from active composting areas or a spill of fuel or lubricants.

In addition, yard waste compost is sold to regional residents and businesses for use in gardens, flower beds, golf courses, and other areas. Compost has been shown to improve the quality of many soils by increasing the soil's water-holding capacity, increasing soil porosity and nutrient-holding capacity, and reducing erosion. However, to the extent there may be contaminants in the compost, these contaminants can be spread over the ground. Contaminants can include visible items such as bits of plastic and glass fragments, and chemicals such as pesticides and herbicides. Analyses also indicate yard debris compost contains trace metals such as lead, zinc, and copper. However, trace metal concentrations are typically below the Washington Department of Ecology guideline standards for compost use. Elevated lead concentrations in compost have been attributed to the inclusion of soil with residential yard debris (Seattle Solid Waste Utility, 1994). Lead paint, and atmospheric deposition from lead smelting and leaded gasoline, are the cause of elevated lead levels in soils in urban environments (Seattle Solid Waste Utility, 1994). Studies conducted by Seattle indicate chemical contaminants in compost are below levels established in regulations protecting public health (Herrera, 1992).

Disposal

Earth impacts associated with the long-haul transport and landfilling of Seattle's non-recycled waste were evaluated in the *1990 Seattle Waste Transport and Disposal Project Final Environmental Impact Statement* which is incorporated by reference. That EIS concluded that impacts—such as changes in topography, a slight change in drainage patterns, and erosion during new landfill cell construction—would occur at the Columbia Ridge Landfill. Mitigation identified by the EIS included designing the final landfill configuration to blend with surrounding topography and keeping active landfill and stockpile areas to a minimum.

Special Waste

Earth impacts associated with special waste are limited to the potential for localized soil contamination from spills at the City's two household hazardous waste facilities. These facilities are designed with spill containment features to reduce the impacts of any spills that do occur.

2.8.3 Additional Impacts of the Proposed Action

This section describes additional earth impacts, compared to No Action, that could result from implementation of the Draft Plan's recommendations. Increased efforts at waste reduction and recycling and changes to collection are not expected to result in additional earth impacts, except to the extent that they could result in the development of new facilities or modifications to existing facilities. Because the Proposed Action does not include any changes

to disposal or to Seattle's household hazardous waste collection facilities, impacts would be the same as those discussed under No Action, above.

Transfer and Processing

Changes at the North and South Recycling and Disposal Stations. The Draft Plan recommends construction of a self-haul recycling center at the South Station as well as the possible acquisition of property at the North Station for construction of a similar facility. The amount of land disturbed during construction of the self-haul recycling center would be about one to two acres. During construction, earth impacts would include erosion of soils exposed during clearing, grading, and excavation, and erosion from temporary construction stock piles. In addition, the South Station site is located on top of an old landfill. If excavations for the recycling center encounter garbage, appropriate disposal of the material would be required. In addition, foundation, retaining wall, road, and utility designs may need to account for differential settlement and possibly gas migration into confined spaces.

New Transfer and Recyclables Processing Facilities. The Draft Plan calls for economic incentives to encourage recyclables processing and manufacturing facilities to locate in Seattle. In addition, the recommended process for rebidding Seattle's residential collection contracts could lead to the development of new, private sector transfer stations or to the modification of existing private facilities. Although the size of these facilities would depend on their individual designs, capacities, and sites, new transfer and recyclables processing facilities would likely be on the order of 10 acres or less. Earth impacts would include erosion from excavations and stockpiles. Other earth impacts would be site specific and could include use of imported soils, disposal of unsuitable soils or excess excavated materials, and special foundation requirements for construction on or near geologically sensitive areas.

If a new technology that does not require traditional transfer is proposed, small staging areas located throughout the City could be required. The size of these staging areas would depend on the actual routing of collection vehicles and the availability of suitable sites within the City. However, on average they should be less than one-half acre each. Some grading, minor excavations, and drainage improvements could be required at these sites.

New and Expanded Composting Facilities. The Draft Plan includes incentives for the private sector to develop a new food waste processing facility such as a composting or anaerobic digestion facility. In addition, the recommended process forrebidding Seattle's residential collection contracts could lead to the development of new facilities for composting vegetative food waste and yard waste and, possibly, to the expansion or modification of existing yard waste composting facilities. Earth impacts resulting from the construction and operation of these facilities would be similar to those described under No Action, above. Grading and excavations for detention ponds and possibly leachate ponds would be required at new facilities. More extensive excavations could be required where composting occurs under cover or within a fully enclosed facility. The size of a new composting facility could range from about 10 to 40 acres, depending on the size of the market it is intended to serve, the particular process technology proposed, and the size of site buffers.

It is also possible that composting facility operators could propose programs such as land application of partially composted yard waste to allow them to handle peak grass deliveries in the spring and early summer. Field tests conducted by Washington State University indicate such land applications can supply nitrogen and other nutrients necessary for plant growth.

2.8.4 Impacts from Alternatives to the Proposed Action

Other alternatives considered in the Draft Plan generally are not expected to result in additional earth impacts. A grass ban could cause localized impacts from illegal dumping. In addition, a grass ban could adversely affect compost quality because grass is an important source of nitrogen. Without nitrogen, leafy and woody material may not degrade as rapidly, and the final compost product may be less useful as a soil amendment. Mandatory participation in recycling programs and/or mandatory separation of materials for recycling would increase the need for recyclables processing, and new facilities or expansion of existing facilities eventually may be necessary to prepare the recyclables for market. A new self-haul material recovery facility at Seattle's South Station would have earth impacts similar to a new recycling center, but would require a larger area and more extensive

excavations and foundation treatment. Food waste transfer at the North Station could require limited excavations for facility modifications.

2.8.5 Potential Mitigation Measures

Mitigation measures that would reduce earth impacts associated with the Proposed Action include:

- For modifications at Seattle's South Recycling and Disposal Station and possibly at the North Recycling and Disposal Station:
  - Conduct location-specific geotechnical investigations to determine recycling center foundation requirements and whether excavations are likely to encounter garbage.
  - Enforce construction contractors' compliance with provisions of their approved construction erosion control and sedimentation plans. Measures typically included in these plans include: minimizing the size of soil stockpiles, covering stockpiles, using temporary sedimentation and erosion control measures such as straw bales and silt fences during construction to reduce erosion, and restoring and revegetating disturbed soils in a timely manner.
  - Use Best Management Practices for sedimentation and erosion control during facility operations, such as maintaining plantings to prevent bare soil, preventing vehicles from driving on unprepared surfaces, and maintaining drainage features to remove accumulated sediment.
- For centralized composting facilities:
  - Consider using specifications and submittal requirements in the upcoming residential collection bidding process to encourage private facilities to be designed in a manner that reduces the potential for contaminants to be included in the compost. For example, bidders could be asked to not accept material in plastic bags, to provide information on their feedstock screening procedures and process controls, to screen the final product, and to report on periodic testing and reporting of contaminant levels in feedstocks and compost products.
  - Consider using specifications and submittal requirements to encourage private facilities to be designed and operated in a manner that reduces the potential for leachate or waste to contaminate soils at the composting site. For example, bidders could be asked to submit information on leachate prevention and collection, site drainage, and the use of impervious liners.
  - Educate waste generators to send only "clean" yard waste and/or food waste for composting. For example, leaves or debris collected adjacent to houses with flaking paint can contain lead and street sweepings can contain lead and oil.
- For new recyclable processing facilities or transfer facilities:
  - Consider requiring new recyclable processing facilities to be sited away from sensitive areas such as steep slopes or unstable soils if they are to qualify for economic development incentives.
  - Require contractors to restore and revegetate disturbed soils in a timely manner during the construction process.

2.8.6 Significant Unavoidable Adverse Impacts

Measures required to comply with existing regulations—such as restrictions on siting facilities in geologically unsuitable areas and control or erosion during construction—can reduce impacts to earth resources. Some level of erosion impacts during construction would be unavoidable, but largely short term.

2.9 WATER

2.9.1 Affected Environment

Overall, the affected environment for water encompasses the Puget Sound region, specifically King, Pierce, and Snohomish counties; eastern Oregon; and long-haul rail transport routes. Generally, surface and ground water resources are markedly different west and east of the Cascade Mountains.

Puget Sound and West of the Cascades

The region west of the Cascades has abundant precipitation and surface water resources, including Puget Sound, rivers, wetlands, lakes, and ponds. Surface water quality is typically excellent in the mountains where rivers originate. Quality tends to degrade as the water moves farther downstream due to the effects of stormwater runoff contaminated by fertilizers from residences, farms, and golf courses; farm animals; soil erosion; poor forest management practices; irrigation; gravel quarrying; industrial activities; and wastewater treatment plant effluent.

Groundwater is located throughout this region within underground formations known as aquifers. Aquifers are relatively porous geologic layers capable of storing usable amounts of water. Groundwater is used for drinking water and irrigation in many areas of western Washington, although most drinking water for the developed areas of King, Pierce, and Snohomish counties comes from surface water. Regional groundwater quality is typically good, although waste discharges can lead to groundwater contamination when pollutants flow through the ground to reach the aquifers.

Eastern Oregon

Water resources in the Puget Sound area are strongly influenced by the region's relatively wet climate and moderate temperatures. In contrast, water resources at the Columbia Ridge Landfill are typical of the semi-desert and desert climates east of the Cascades. This region is characterized by significantly lower annual rainfall, colder winters, and warmer summers. East of the Cascades, there are fewer streams, lakes, and wetlands, and groundwater is typically replenished more slowly. These conditions reduce the risks of groundwater contamination from landfill disposal.

Regulations

Water quality standards in Washington are found in Chapter 173-201 of the Washington Administrative Code (WAC). As discussed in **Section 1.1.4,** regulations issued under RCRA Subtitle D and Washington State "Criteria For Municipal Solid Waste Landfills" include restrictions on siting landfills near surface water resources and in floodplains, and require stormwater controls. These regulations also require surface water control systems to manage water running onto and off of the landfill area and measures to prevent erosion. Furthermore, the State standards include less stringent design criteria for landfills located in arid regions (generally east of the Cascade mountains). Nonetheless, Seattle's contract for arid region landfill disposal requires the landfill to be designed to meet the more stringent non-arid design requirements.

2.9.2 Impacts—No Action Alternative

The No Action Alternative would continue Seattle's existing waste reduction, recycling, processing, transfer, disposal, and special waste programs.

Waste Reduction and Recycling

In general, continuing waste reduction programs that encourage sustainable building practices, less packaging, and reduced paper use would not have an adverse effect on water resources. Similarly, recycling programs (except composting and new recyclables processing facilities which are discussed below) should not have adverse impacts on water resources. Grasscycling and on-site composting could result in pesticides and herbicides in surface waters, but this effect should be localized and minimal.

Collection and Processing

Continuing current collection programs for garbage, yard waste, and recyclables, are not expected to adversely affect water resources. Potential impacts associated with processing and transfer facilities include increased surface water runoff from impermeable surfaces such as parking lots, roads, and roofs; surface water contamination due to runoff contacting oil, grease, and waste; and sedimentation of wetlands, streams, and lakes due to erosion and runoff from areas disturbed by construction activities.

The No Action Alternative would continue Seattle's program for collecting and centralized composting of yard waste (currently at Cedar Grove Composting). Ongoing impacts include some potential for increased runoff from the impermeable outdoor composting area as well as some ongoing potential for water contamination from active composting areas or due to a spill of fuel or lubricants. Leachate or runoff water from a composting facility can often be collected and reused to moisten materials during the composting process, reducing or eliminating the need to discharge water off-site.

Disposal

The *1990 Seattle Waste Transport and Disposal Project Final Environmental Impact Statement*, which is incorporated by reference, concluded that there would be the potential for a derailment or other accident leading to the release of waste from ruptured containers near a body of water. At the Columbia Ridge Landfill, there would be the potential for localized erosion during heavy rainfall. Identified mitigation measures included having an emergency response plan in place in the event of an incident and erosion control measures. The EIS concluded that groundwater quality impacts from landfill development are not expected because mitigation measures, such as a landfill liner system, are incorporated into the landfill design.

Special Waste

Limited surface water contamination could result from spills at the City's two household hazardous waste facilities. These facilities are designed with spill containment features to reduce the impacts of any spills that do occur. Excluding latex paint, the City's facilities have averaged about three spills per year. Examples of spilled materials include acids, pesticides, and solvents. Spills have all been less than one gallon and have not escaped facilities' spill containment areas.

2.9.3 Additional Impacts of the Proposed Action

This section describes additional water impacts, compared to No Action, that could result from implementation of the Draft Plan's recommendations.

Waste Reduction, Recycling, and Collection

Increased efforts at waste reduction and recycling and changes to collection are not expected to result in additional water impacts, except to the extent that they could result in the development of new facilities or modifications to existing facilities. Because the Proposed Action does not include any changes to disposal or to Seattle's household hazardous waste collection facilities, impacts would be the same as those discussed under No Action, above.

Collection, Transfer, and Processing

Transfer Stations and Recyclables Processing Facilities. The Draft Plan recommends construction of a self-haul recycling center at Seattle's South Station as well as the possible acquisition of property at the North Station for construction of a similar facility. The Draft Plan also calls for economic incentives to encourage recyclables processing and manufacturing facilities to locate in Seattle. In addition, the recommended process for re-bidding Seattle's residential collection contracts could lead to the development of new private sector transfer stations or to the modification of existing private facilities within the City. It is also possible that a new technology which did not require a traditional transfer station could be proposed.

Water impacts during construction of these facilities would include sedimentation from the erosion of exposed soils and stockpiles, the need to dispose of water from foundation excavations, and increased run-off from paved or covered areas. Operation of transfer facilities could result in surface water contamination from spills of fuels or lubricants and from contact with food waste, yard waste, or garbage. Impacts at recyclables processing facilities would be similar except that the potential for contacting garbage or yard waste would be eliminated. Spills of chemicals associated with the particular processing or manufacturing process would be possible; the nature of impacts would be site and technology specific.

Another possible outcome of the Draft Plan's recommended process for rebidding its residential collection contracts would be a proposal to add food waste transfer at private stations or, possibly, at the City's South Station. Such a proposal could add a special transfer area or transfer building for accepting food waste from collection trucks and transferring multiple loads of food waste into transfer trailers. Because food waste tends to be wetter than regular garbage, additional liquids would be generated as the food waste is unloaded, temporarily stored, and re-loaded. These liquids could contaminate surface water because they would likely have high levels of biological oxygen demand and other characteristics that could degrade water quality. A food waste transfer facility could also be constructed elsewhere, with similar potential impacts.

New/Expanded Composting Facilities. The Draft Plan includes incentives for the private sector to develop a new food waste facility such as a composting or anaerobic digestion facility. In addition, the recommended process for rebidding Seattle's residential collection contracts could result in developing new facilities for composting vegetative food waste and yard waste and, possibly, expanding or modifying existing yard waste composting facilities.

Impacts at a new or expanded centralized compost facility would vary depending on where the facility was located and how it would be designed and operated. Potential impacts include increased runoff from impermeable outdoor composting areas and water contamination from active composting areas or due to a spill of fuel or lubricants. However, leachate or runoff water from a composting facility can often be collected and reused to moisten materials during the composting process, reducing or eliminating the need to discharge water off-site. If the facility were located in an arid area east of the Cascade mountains, the composting operation would more likely consume large quantities of water or other liquids in order to keep the composting materials properly moistened. This water could be fresh water from an on-site well or public drinking water supply, reclaimed water, or even waste liquids. On the other hand, surface water resources are less abundant east of the Cascade Mountains and, depending on site-specific conditions, could be far removed from a composting operation.

2.9.4 Impacts from Alternatives to the Proposed Action

Other alternatives considered in the Draft Plan generally are not expected to result in additional water impacts. Mandatory participation in recycling programs and/or mandatory separation of materials for recycling would increase the need for recyclables processing, and new facilities or expansion of existing facilities eventually may be necessary to prepare the recyclables for market. On the other hand, mandates would reduce the amount of garbage collected. To the extent that this would reduce the number of train trips to the landfill, the chances of accidents and spills would be proportionally reduced. A new self-haul material recovery facility at Seattle's South Station would have similar impacts to the new recycle center discussed above. Yard waste/food waste transfer at the North Station could require building modifications to ensure that liquids from food waste drains to the sanitary sewer and does not contaminate surface water.

Banning of grass from yard waste could lead to increased illegal dumping. Runoff from illegal piles of grass could degrade water quality through direct runoff of the grass into receiving waters, by nutrients leaching into the water, and by contaminants such as residual pesticides.

2.9.5 Potential Mitigation Measures

Mitigation measures identified in **Section 2.8.5, *Earth***, would reduce earth impacts and the potential for erosion would also reduce water impacts associated with the Proposed Action. Additional mitigation for water resources could include:

- For modifications at Seattle's South Recycling and Disposal Station and possibly at the North Recycling and Disposal Station:
  - Use measures during facility operations such as preventing vehicles from driving on unprepared surfaces and installing and maintaining oil/water separators to trap oil and grease before they can leave the site.
  - If food waste transfer at the South Station is proposed, design, construct, and operate the facility to collect food waste liquids, pre-treat the liquids to meet applicable wastewater discharge standards, and dispose of it in the sanitary sewer. Also, use leak-proof collection vehicles and transfer vehicles for food waste so leachate does not escape along haul routes or when loaded trailers are stored awaiting transport at the transfer station.
- For centralized composting facilities:
  - Possibly use specifications and submittal requirements to encourage private facilities to be designed and operated in a manner that reduces the potential for leachate or waste to run off from the composting site, or for water to percolate through soils into the groundwater. For example, bidders could be asked to submit information on proximity to wetlands, streams, and lakes, leachate prevention and collection, site drainage, and the use of impervious liners. Bidders could also be required to demonstrate compliance with certain minimum design or performance criteria.
- For new recyclable processing facilities or transfer facilities:
  - Possibly require facilities with the potential to impact surface water runoff or water quality to provide information on mitigation measures to protect water resources if they are to qualify for economic development incentives.

2.9.6 Significant Unavoidable Adverse Impacts

Mitigation measures—such as compliance with regulations, including landfill design requirements—for groundwater protection and control of erosion during construction can reduce impacts on water resources. However, some impacts would be unavoidable. No significant long-term impacts on water resources are expected.

2.10 PLANTS AND ANIMALS

2.10.1 Affected Environment

King, Pierce, and Snohomish Counties

Most of the impacts to plants and animals resulting from implementation of the Draft Plan's recommendations would result from the construction and operation of facilities. Existing and new transfer and processing facilities would most likely be concentrated in the area encompassing Seattle and King, Pierce, and Snohomish counties. Much of this area lies within the Puget Soundsubarea of the Western hemlock vegetation zone (Franklin and Dyrness, 1988).

Coniferous or broadleaf forest is the dominant vegetation cover in undeveloped suburban and rural areas. Precipitation increases with distance from Puget Sound. As a result, forest communities in the lowlands near the Puget Sound tend to be dominated by species tolerant of relatively warm and dry conditions. At higher elevations, forest communities are composed of species adapted to greater amounts of precipitation and colder temperatures. Important habitats include parks and wildlife preserves; wetlands and estuaries; lakes, rivers and streams; Federal, State, and private forests; and areas with site-specific environmental values. City and County comprehensive land use plans describe many of these sensitive habitats and map their locations. Wildlife supported by these habitats include species such as elk, Columbia black-tailed deer, cougar, coyote, raccoon, opossum, beaver, muskrat, red squirrel, Townsend's chipmunk, mountain beaver, various small rodents, waterfowl, shorebirds, raptors, and a number of passerine bird species.

This three-county region also includes the most urbanized areas in Washington, where much of the native vegetation has been eliminated. Human activity and lack of vegetative cover limits use of these areas by native wildlife. Exotic species such as starlings and English sparrows are common, while native species are usually concentrated near relatively large islands of natural vegetation such as parks and greenbelts. In suburban areas, native plant communities and agricultural fields provide habitat for both native and exotic species such as coyotes, raccoons, opossums, Columbia black-tailed deer, red-tailed hawks, a wide range of native songbirds as well as exotic species such as starlings and Chinese ring-necked pheasants. In predominantly rural areas, forest communities dominate, but logging has produced large stands of second growth coniferous forest, which provides habitat for comparatively few species because of the lack of habitat diversity.

The Washington Natural Heritage Program reports nine confirmed populations of sensitive plants—a classification indicating plant species that are declining in number and could become threatened or endangered (see *Regulations*, below). The Washington Department of Fish and Wildlife has identified a number of wildlife species sensitive to human impact. Seven of these are classified by the State as threatened or endangered: the Western pond turtle, marbled murrelet, bald eagle, Peregrine falcon, sandhill crane, Northern spotted owl, and Western gray squirrel. With the exception of the Western pond turtle and Western gray squirrel, these species are normally highly mobile, passing through the area during migrations, or associated with mature stands of timber not likely to be disturbed except by timber harvest. In addition, the bald eagle, marbled murrelet, and Northern spotted owl are federally listed as threatened while the Peregrine falcon is federally listed as endangered.

East of the Cascade Mountains

Seattle's garbage is currently transported by rail to the Columbia Ridge Landfill in Gilliam County, Oregon. The Columbia Ridge site also includes recyclables processing and composting facilities.

Existing vegetation near this site consists primarily of native rangeland and cultivated cropland, principally winter wheat farmland, typical of the shrub-steppe region of the Columbia River Basin. Natural shrub-steppe habitats include plant species such as sagebrush, bunch grasses, desert parsley, and juniper. In many areas, however, grazing has disturbed soils and introduced exotic species such as rabbitbrush and cheatgrass. Wildlife in this area

includes horned lark, western meadowlark, raptors such as Swainson's hawk and turkey vulture, game birds such as quail and pheasant, mule deer, coyote, jack rabbit, and various other species of birds, mammals, and reptiles. No state or federally listed threatened, endangered, or sensitive plant species are known to exist within the boundaries of the Columbia Ridge Landfill site (Jones and Stokes Associates, 1992).

Regulations and Guidelines

Plants and animals are protected or managed under a range of Federal, State, and local laws and regulations.

Species listed as federally threatened or endangered and their critical habitats are protected under provisions of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.). Any activity with the potential to impact these species would require consultation with the U.S. Fish and Wildlife Service under provisions set forth in Section 7 of the Endangered Species Act. The Washington Department of Fish and Wildlife (WDFW) lists Priority Habitats and Species of Special Concern (SSC), including Washington species the State considers endangered, threatened, or sensitive; candidates for listing; and species to be monitored. These categories are not protected by State legislation or regulation, but are listed to assist agency management and decision making. The Oregon Department of Fish and Wildlife classifies species as threatened or endangered and can take steps to ensure their recovery (OAR 635-100-100 to 635-100-130).

Wetlands are also protected under Federal and local regulations. The U.S. Army Corps of Engineers regulates the discharge of dredge and fill material into waters of the United States, including wetlands, under Section 404 of the Clean Water Act. Both King and Pierce counties have enacted sensitive areas ordinances and related regulations to protect wetlands and other sensitive areas. While Snohomish County does not have a comprehensive ordinance that addresses mitigation for wetlands or other critical areas, the county has passed a number of comprehensive plans that include general guidelines to protect habitat values associated with wetlands and streams.

2.10.2 Impacts—No Action Alternative

The No Action Alternative would continue Seattle's existing waste reduction, recycling, collection, transfer, processing, disposal, and special waste policies and programs. With the exception of landfill disposal, which will have ongoing impacts to habitats and animal species, continued implementation of Seattle's programs and continued operation of its facilities should not result in any significant adverse impacts to plants, animals, or habitats. (The potential for programs and facilities to attract pests, such as rodents and insects, is discussed in **Section 2.5, *Public and Occupational Health*)**.

Continued disposal at the Columbia Ridge Landfill would have ongoing impacts because landfills are typically developed and closed in phases. New habitat would be disturbed as a new phase or cell is constructed; after a cell is closed, seeding and planting can create new habitat. Typically, construction impacts are greatest with construction of the first landfill phase since scale facilities, shops, roads, detention ponds, and other support facilities are also constructed at that time. Increased competition for habitat also occurs on adjacent lands as wildlife lose forage, nesting, and cover habitat. Native and nonnative species that are currently foreign to the area could become more abundant. In addition to impacts from constructing new cells, operational impacts can include disturbances to wildlife due to noise from the operation of heavy equipment and glare from artificial site lighting.

The *1990 Seattle Waste Transport and Disposal Project Final Environmental Impact Statement*, which is incorporated by reference, concluded that impacts to plants and animals at the Columbia Ridge Landfill would include clearing vegetation on 850-acres; permanent conversion of about 50 acres to roads and other features; wildlife disturbances to within one-half mile of the site; and the potential for non-native species to become more abundant. Mitigation measures identified in that EIS included revegetation; constructing nesting platforms and perching structures on site; and providing on-site water sources for wildlife.

2.10.3 Additional Impacts of the Proposed Action

Waste Reduction, Recycling, Collection, and Disposal

Many of the programs and policy directions included in the Draft Plan's recommendations, such as changes to Seattle's waste reduction and collection programs, would not result in significant adverse impacts to habitat or wildlife. In addition, the Draft Plan's recommendations do not include changes to disposal or special waste relative to No Action.

Transfer and Processing

The Draft Plan's recommendations include constructing a new recycling center at the City's South Recycling and Disposal Station, providing economic incentives for new recyclables processing and manufacturing facilities to locate within the City, and allowing for development of new private-sector transfer facilities. Modifications at the South Station will occur in an area that is already paved, and new facilities would likely be sited in highly developed industrial areas of the City where the potential for significant disturbances to habitat and wildlife is minimal. To the extent that facilities are located outside of industrial areas or that construction occurs adjacent to wetlands or shorelines, the potential for adverse impacts would increase.

The Draft Plan's recommendations for collection could lead to siting and construction of new composting or processing facilities for food waste and yard waste and/or to Seattle's use of a wider range of existing facilities. Because of odor and other siting issues, it is likely that new facilities would be located in less developed areas of the Puget Sound region or possibly in eastern Washington or Oregon. The size of each new facility could range from about 10 to about 40 acres, depending on markets and other factors. Impacts to plants and animals would be site-specific and could include displacement of wildlife to adjacent habitats, loss of habitat, wildlife disturbance from noise and glare, and changes to the composition of local wildlife populations to favor species that would be more compatible with an operating composting facility. To the extent that new facilities are constructed adjacent to surface waters, indirect impacts to aquatic habitats, fish, and other aquatic animals could result from changes in water quality.

If additional yard waste processing capacity is developed and it results in land application of partially processed yard waste, it could result in the introduction of noxious weeds or non-native plant species. This would tend to occur if the yard waste is insufficiently processed and if native plant species at the land application site differ from those in the compost feed stock. Providing sufficient processing time for the material to reach temperatures needed to kill weed seeds would help alleviate this potential problem.

If affected habitat is critical to state or federally listed threatened or endangered species, impacts could be significant. Protection of waterways and wetlands would aid the Western pond turtle. The Western gray squirrel is found from Pierce County south and in scattered locations east of the Cascades from the Methow Valley, south to Klickitat County (Rodrick and Milner, 1991). Western gray squirrels may be found in three distinct habitat types: Oregon white oak/prairie association with interspersed Douglas fir; the grand fir-Douglas fir zone in the Lake Chelan and Methow Valley regions; and valleys with oak-ponderosa pine woodlands in the Columbia River Gorge (Rodrick and Milner, 1991). Oregon white oak may be found on drier, lower elevation sites anywhere in the western hemlock zone (Franklin and Dyrness, 1988). Both white pine and lodgepole pine, are common on glacial drift in the Puget Sound area (Franklin and Dyrness, 1998). The western gray squirrel is vulnerable to any development that results in the loss of its primary habitat, undeveloped mature oak-pine forest.

2.10.4 Impacts from Alternatives to the Proposed Action

Alternatives to the Proposed Action are not expected to result in additional impacts to plants and animals. Bans and mandates would reduce the demand for transfer, processing, and disposal, thereby reducing the level of impacts compared to No Action. A new self-haul material recovery facility at the South Recycling and Disposal Station would have impacts similar to those for a new self-haul recycle center.

2.10.5 Potential Mitigation Measures

A range of Federal, State, and local regulations are in place to help reduce impacts to plants and animals. In addition to protection of critical habitat provided by the Federal Endangered Species Act, local sensitive areas ordinances restrict the amount of impact to wetlands and other sensitive areas. The need for additional mitigation would be site and impact-specific but could include measures such as habitat enhancement. New facilities would largely be developed by the private sector, and mitigation would be imposed by permitting agencies. To the extent that Seattle wishes to consider impacts to plants and animals in its process for rebidding residential collection and processing contracts, bidders could be asked to submit information and plans and features that reduce or mitigate these impacts.

2.10.6 Significant Unavoidable Adverse Impacts

Compliance with regulations to protect sensitive areas, critical habitats, and surface water would reduce but not eliminate impacts to habitat, plants, and animals associated with the construction of new facilities.

PART 3:
Glossary, References, and Distribution

3.1 GLOSSARY

Aerated static pile: A composting system that uses a series of perforated pipes (or equivalent) air distribution system running underneath a compost pile and connected to a blower that either draws or blows air through the piles. Little or no pile agitation or turning is performed.

Aerobic: The breakdown of organic matter by natural processes that use oxygen.

Alluvial soil: Silt, sand, gravel, cobbles, and boulders deposited by rivers.

Ambient: Surrounding; pertaining to the environment in an area or around a facility.

Ambient air quality standard: An established concentration, exposure time, and frequency of occurrence of an air contaminant in outside air which shall not be exceeded.

Anaerobic: The breakdown of organic and inorganic matter by natural processes that do not use oxygen.

Anaerobic digestion: A process used to stabilize waste materials such as sewage sludge or food waste in the absence of oxygen.

Animal Feed Conversion: The processing of food waste into a product that is suitable for use as animal feed.

Annual Geometric Mean: A method of providing a mean value for a group of data thought to be more representative than the arithmetic mean (average), if the data are log-normally distributed. The geometric mean of N data values is computed by multiplying the N values together and taking the Nth root of the product.

Aquifer: A subsurface geologic formation, group of formations, or part of a formation capable of yielding water in sufficient quantity to be a source of supply.

Arid: A location typically having less than twelve inches of precipitation annually.

Asbestos: A noncombustible, chemical-resistant, fibrous material used for fireproofing, electrical insulation, building materials, brake linings, and chemical filters. Because of health risks associated with asbestos, special requirements apply to its disposal.

Attainment Area: A geographic area that, by mutual agreement of federal, state and local regulatory agencies, meets the ambient air quality standard for a specified pollutant.

Basalt: A dark, fine-grained to dense, volcanic rock commonly occurring in sheet-like lava flows.

Bi-weekly: Occurring every two weeks.

Bioaerosols: Organisms or biological agents that can be dispersed through the air and affect human health. Bioaerosols can contain living organisms including bacteria, fungi, actinomycetes, arthropods, and protozoa as well as microbial products such as endotoxin, microbial enzymes, β-1,3-glucans, and mycotoxins.

Biofilter: Use of living biological organisms to chemically break down potential contaminants or odor-causing substances into inoffensive by-products.

Biogas: Gas resulting from the biological degradation of organic matter. The gas from anaerobically processing organic matter can be high in methane.Biogas with high methane content can be used as a fuel source.

Biological oxygen demand (BOD): Oxygen consumption by micro-organisms; an indication of compost maturity and a tool for studying the composting process.

Biomedical waste: Carcasses of animals exposed to pathogens, bio-safety level 4 disease waste, cultures and stocks of etiologic agents, human blood and blood products, pathological waste, sharps, and other waste determined to be infectious.

Biosolids: Municipal sewage sludge resulting from the wastewater treatment process that can be beneficially recycled.

Buffer: A separation area or distance that isolates a particular action or site from off-site properties in order to reduce environmental impacts.

Buy-back center: A facility which collects, receives, or buys recyclable materials from household, commercial, or industrial sources for the purpose of accumulating, grading, or packaging recyclable materials for subsequent shipment and reuse.

C&D debris: Solid waste originating from the construction or demolition of buildings, roads, and other structures. Generally includes, but is not limited to, concrete, brick, bituminous concrete, wood, masonry, composition roofing, roofing paper, shakes, shingle, linoleum, glass, dirt, gravel, steel, aluminum, copper, galvanized or plastic piping, or plaster. Certain components of the construction waste stream are considered to be inert and other non-inert.

Centralized compost facility: A major facility or commercial facility where large-scale composting occurs and which typically sells the finished compost product.

Co-collection: To collect more than one material but to keep those materials separated in multiple compartments of a collection vehicle.

Co-composting: Composting process utilizing two or more feedstocks.

Commercial waste: Waste materials originating in wholesale, retail, institutional, or service establishments, such as office building, stores, markets, theaters, hotels and warehouses.

Commingle: To intermix waste materials such as commingling yard waste with vegetative food waste.

Commingled collection: To collect more than one material in a single compartment container, such as collecting yard waste and vegetative food waste in a single collection vehicle.

Composite liner: A landfill liner system consisting of two components, the upper component is a plastic liner and the lower component is generally compacted soil (clay).

Compost: The stabilized and sanitized product of composting which is beneficial to plant growth.

Compostable paper: Paper that is capable of decomposing naturally or of yielding safe, nontoxic end products.

Composting: The controlled aerobic decomposition of solid waste yielding a product for use as a soil conditioner.

Consent Decree: Agreements between regulatory agencies and facility owners, usually in response to a violation of or non-compliance with a rule or regulatory order. In a consent decree, the facility owners voluntarily agree to special terms and conditions outside of the rule or order, usually as a temporary measure until full compliance can be obtained.

Cost effective: A good value for the money spent.

Curbside-collected: The collection of garbage, yard waste, or recyclables from the alley.

Dangerous waste: Any discarded, useless, unwanted, or abandoned nonradioactive substance, including, but not limited to, certain pesticides, or any residues or containers of such substances which are disposed of in such quantity or concentration as to pose a substantial present or potential hazard to human health, wildlife, or the environment because such wastes or constituents or combinations of such wastes: (a) Have short-lived, toxic properties that may cause death, injury, or illness, or have mutagenic, teratogenic, or carcinogenic properties; or (b) Are corrosive, explosive, flammable, or may generate pressure through decomposition or other means (Chapter 70.105.010 RCW).

dBA: An A-weighted decibel scale that measures sound levels and is weighted to frequencies perceived by humans.

Decibel: A measure of sound intensity, defined as 10 times the logarithm of the ratio of two sound pressures squared.

Decomposition: Conversion of organic matter as a result of microbial and/or enzymatic interactions.

Detention ponds: An impoundment for the temporary storage of stormwater to improve quality and/or reduce the mass discharge rate.

Dewater: To remove water from a waste material or waste product.

Disincentive: A deterrent; a thing or factor that keeps someone from doing something.

Disposal site: The location where any final treatment utilization, processing, or deposit of solid waste occurs (Chapter 70.95.030 RCW).

Dry wall: Wallboard consisting of a core of set gypsum surfaced with paper or other fibrous material suitable to receive paint or paper.

Equivalent Sound Level (L_{eq}): The level of constant sound with the same sound energy as the actual fluctuating sound.

Erosion: The wearing away of the land surface by running water, wind, ice, or other natural processes.

Essential Public Facilities: A category of facilities defined by Washington's Growth Management Act. Local governments must address the siting of Essential Public Facilities in their comprehensive plans.

Extremely Hazardous Waste: Any dangerous waste which (a) will persist in a hazardous form for several years or more at a disposal site and which in its persistent form (i) presents a significant environmental hazard and may be concentrated by living organisms through a food chain or may affect the genetic makeup of man or wildlife, and (ii) is highly toxic to man or wildlife (b) if disposed of at a disposal site in such quantities as would present an extreme hazard to man or the environment (Chapter 70.105.010 RCW).

Feedstock: Organic material used for the production of compost. Supplements including additives and amendments are not feedstocks.

Fermentation: The enzymatically controlled anaerobic transformation of an organic compound.

Ferrous metals: Predominantly iron and steel materials.

Food waste: Residual food from residences, institutions, or commercial facilities, or unusable portions of fruit, animal, or vegetable material, including compostable paper resulting from food production.

Food waste processing facility: A composting, anaerobic digestion, or animal feed conversion facility used to process food waste into useful products.

Fugitive dust: Dust composed of soil particles that are entrained in the air, typically due to the action of wind or machinery on exposed surfaces.

Garbage: Solid waste that remains after recyclables and compostables have been removed.

Geologic hazard area: A sensitive area defined in land use and zoning codes requiring specific setbacks or special design treatment if developed.

Glacial till: A dense soil layer consisting of a mixture of clay, silt, sand, gravel, and boulders ranging widely in size and shape deposited and compressed by an advancing glacier into a hard concrete-like substance

Grasscycling: To cut or mow grass leaving the clippings on the lawn.

Green mulch: An organic nutrient source from partially composted curbside yard debris. The material is ground and composted for 3 to 5 days.

Groundwater: Water that occupies the free space in soil, sand, gravel or rock.

Growth Management Plan: A comprehensive land use plan adopted by a local government in Washington State and addressing the requirements of the State Growth Management Act.

Gypsum: A colorless, white, or yellowish mineral used in the manufacture of drywall or gypsum wallboard, plaster of Paris, various plaster products, and fertilizers.

Hazardous waste: Includes all dangerous and extremely hazardous waste, including substances composed of both radioactive and hazardous components (Chapter 70.105.010 RCW).

Household hazardous waste: Hazardous waste generated by households that qualifies as a moderate risk waste.

Household hazardous waste facilities: A permanent facility where household hazardous wastes are collected and packaged, then transported for disposal at a permitted, hazardous waste disposal facility.

Impermeable: Rock, sediment, soil, or man-made surface that fluids cannot pass through.

Incineration: A process of reducing the volume of solid waste operating under federal and state environmental laws and regulations by use of an enclosed device using controlled flame combustion (Chapter 70.95.030 RCW).

Inert waste: Noncombustible, nondangerous solid wastes that are likely to retain their physical and chemical structure under expected conditions of disposal, including resistance to biological attack and chemical attack from acidic rainwater.

Infectious waste: See biomedical waste.

Intermodal facility: A facility used for transferring containers from one transportation mode to another (e.g., from truck trailers to rail cars).

In-vessel process: A system using mechanized equipment to compost wastes in an enclosed area with controlled amounts of moisture and oxygen for rapid decomposition.

Landfill: A disposal facility or part of a facility at which solid waste is permanently placed in or on land and which is not a land treatment facility (WAC 173-304-100).

Leachate: Water or other liquid that has been contaminated by dissolved or suspended materials due to contact with solid waste or gases therefrom (WAC 173-304-100).

Long-haul transport: Hauling solid waste to a distant disposal site.

Material recovery facility: A facility where commingled recyclables are sorted and processed.

Medical waste: All the infectious and injurious waste originating from a medical, veterinary, or intermediate care facility (WAC 173-304-100).

Minimum Functional Standards: WAC 173-304, the minimum functional standards for solid waste handling.

Mitigation: Avoiding an adverse impact by not taking a certain action or parts of an action; minimizing adverse impacts by limiting the degree of magnitude of the action and its implementation; rectifying an adverse impact over time by preservation and maintenance operations during the life of the actions; and compensating for adverse impacts by replacing or providing substitute resources or environments.

Mixed municipal solid waste: All putrescible and nonputrescible solid and semisolid wastes, including, but not limited to, garbage, rubbish, ashes, industrial wastes, swill, demolition and construction wastes, abandoned vehicles or parts thereof, and recyclable materials (Chapter 70.95.030 RCW). This includes all liquid, solid, and semisolid materials which are not the primary products of public, private, industrial, commercial, mining, and agricultural operations. Solid waste includes, but is not limited to sludge from wastewater treatment plants and septage from septic tanks, wood waste, dangerous waste, and problems wastes (WAC 173-304-100).

Moderate Risk Waste: (a) any waste that exhibits any of the properties of hazardous waste but is exempt from regulation under this chapter solely because the waste is generated in quantities below the threshold for regulation, and (b) any household wastes which are generated from the disposal of substances identified by Ecology as hazardous substances (Chapter 70.105.010 RCW).

Negative aeration: The process of drawing air through a composting pile by applying a negative pressure (vacuum) to air collection system under the pile. The collected air can then be treated for odor control if desired.

Non-project action: Adoption of a plan or policy that could ultimately lead to adverse environmental impacts.

Notices of Violation: A formal notification by a regulatory agency of the failure of a facility to comply with a regulatory rule or the terms of a permit or order issued by the regulatory agency. A monetary fine frequently accompanies a notice of violation.

Nuisance pollutants: Pollutants for which no formal standard or other criteria are used to evaluate impacts. Rather, impacts for these pollutants are evaluated on the basis of regulator judgment. Examples of nuisance pollutants are odor and dust.

Organic waste or organics: Waste material containing carbon-to-carbon bonds and being biodegradable. The organic fraction of mixed municipal solid waste includes paper, wood, food wastes, and yard wastes.

Outwash soil: Sand and gravel deposited by meltwater streams in front of the end moraine or the margin of an active glacier.

Ozone: A highly reactive form of oxygen created by sunlight-activated transformations of nitrogen oxides and volatile organic compounds in the atmosphere.

Particulates: Fine solid particles that remain individually dispersed in the atmosphere.

pH: A value indicating the degree of acidity or alkalinity; pH 7 = neutral, pH <7 = acid, pH>7=alkaline; the negative logarithm of the hydrogen ion concentration of a solution.

Pick line: A table or conveyor belt on which solid waste is manually sorted and certain items removed.

PM_{10}: Suspended particles less than 10 micrometers in diameter that can be inhaled deeply and are linked to human health impacts. PM_{10} is generated by industrial operations, residential wood burning, motor vehicle fuel combustion, and tire action on pavement.

Porosity: The ratio of the volume of the voids or pores to the total volume of the soil.

Post-closure: The requirements placed on disposal facilities after closure to ensure their environmental safety for a number of years after closure.

Post-consumer food waste: Food materials or products that have served their intended use and have been discarded for disposal after passing through the hands of a final user.

Pre-consumer food waste: Food materials or products that are being discarded for disposal but have not been consumed, such as food items thrown away by grocery stores.

Processing: An operation to convert a solid waste into a useful product or to prepare it for disposal (WAC 173-304-100).

Producer responsibility: Manufactures and distributors being responsible for minimizing harmful environmental effects in all stages of product's life cycle: design, selection and transport of materials; processing and manufacturing; packaging, storage, and distribution; consumer use and re-use; collection and recycling of obsolete products; marketing recycled resources; and managing residual waste.

Putrescible: Waste that decomposes and becomes rotten and foul-smelling.

Queuing: To form a line while waiting to be served, such as the line formed upon entering a transfer station.

Rate incentive: Pricing designed to positively influence a desired behavior.

Recyclables or recyclable materials: Solid wastes that are separated for recycling or reuse, such as papers, metals, and glass, that are identified as recyclable material pursuant to a local comprehensive solid waste plan.

Recyclables processing facility: A facility where recyclables are sorted, packaged, converted to feedstocks, and/or revised in manufacturing.

Recycle center: A salvage and recycling use in which recyclable materials are collected, stored, and/or processed, by crushing, breaking, sorting and/or packaging, but not including any use which is defined as a salvage yard.

Recycling: Transforming or remanufacturing waste materials into usable or marketable materials for use other than landfill or incineration.

Recycling collection station: A salvage and recycling use in which weather resistant containers are provided for the collection of the following recyclable materials: glass, aluminum cans, tin cans, and paper; and/or fully enclosed containers are provided for the collection of secondhand goods for processing at another location.

Recycling and disposal station: See Transfer/recycling station

Resource conservation: Conserving non-renewable resources such as fossil fuels by efficient use or substitution.

Salvaged materials: Material saved from destruction or waste and put to further use.

Scoping: A process to determine the issues to be evaluated in an EIS.

Sedimentary: Of or relating to rocks formed by the deposition of sediment.

Seismic hazard areas: Those areas subject to severe risk of earthquake damage as a result of seismically induced settlement or soil liquefaction.

Seismic upgrade: To make improvements to a facility or structure so that damage from an earthquake is minimized.

Self-haul: Materials hauled to transfer or disposal site by generator rather than by contracted hauler.

Self-hauling center: A facility used for the collection of solid waste materials such as yard waste, recyclables, and/or garbage where the materials are taken by individuals and deposited into designated containers.

Self-sort recycling center: A facility used for the collection of recyclable materials where the materials are taken by individuals and deposited into designated containers.

Sensitive areas: Those areas which are subject to natural hazards or those land features which support unique, fragile, or valuable natural resources including fishes, wildlife and other organisms and their habitat and such resources which, in their natural state carry, hold, or purify water. Development in sensitive areas is often limited by local government regulation.

Sensitive areas ordinance: A regulation to protect environmentally sensitive features by regulating development and alterations to the sensitive areas.

Sharps: Hypodermic needles, razor blades.

Sludge: A semisolid substance consisting of settled solids combined with varying amounts of water and dissolved materials generated from a wastewater treatment plant or other source (WAC 173-304-100).

Slurry: A thin watery mixture of fine insoluble material.

Solid Waste: See mixed municipal solid waste

Special waste: Waste that requires special handling, processing and/or disposal (e.g., medical waste, asbestos).

Spill containment: Structures to keep a spill within certain limits, such asbermed, paved areas or double-walled vessels.

Static piles: A compost pile that is not turned or agitated during the composting process.

Stormwater: Water that falls as precipitation and drains from the land surface.

Subtitle D: Solid, nonhazardous waste section of the Resource Recovery Act (RCRA) (40 CFR part 258).

Suspended solids: Solids in a wastewater stream that can be removed from water by filtration.

Sustainable building: Designing and constructing new or remodeled buildings to conserve natural resources and improve environmental quality throughout the building's life. This includes energy efficiency, water and resource conservation, use of recycled content or salvaged materials, and site orientation to take advantage of sunlight and landscape features.

Till: Unstratified drift, deposited directly by a glacier without reworking by meltwater, and consisting of a mixture of clay, silt, sand, gravel, and boulders ranging widely in size and shape.

Transfer building: A building at a transfer station where the transfer of solid waste from either self-hauled vehicles or commercial vehicles to transfer trailers occur.

Transfer trailers: Detachable containers used to haul solid waste from transfer stations to disposal facilities. Transfer trailers can be transported either by tractor or railroad car.

Transfer/recycling station: A permanent, fixed facility used by individuals and route collection vehicles to deposit collected solid waste from off-site into a larger transfer vehicle for transport to a solid waste handling facility. Includes drop-off of recyclables.

Urban Growth Areas: Areas where development is to be concentrated as designated in Growth Management Plans under the Growth Management Act (RCW 36.70A).

Variable can rate: A charge for solid waste services based on the volume of waste generated measured by the number of containers set out for collection.

Vegetative food waste: Plant-based food waste excluding such items as meats, fish, and eggs.

Volatile organics: Organic chemicals that rapidly evaporate at standard air pressures and temperatures.

Wash water: Water used to wash or clean a facility.

Waste Reduction: Reducing the amount or toxicity of waste generated or reusing materials.

White goods: Used major appliances such as washers, dryers, and refrigerators, freezers, air conditions, stove, and water heaters.

Windrow: Elongated compost piles. The piles or windrows are aerated naturally by a chimney effect, by mechanically turning the piles with a machine such as a front-end loader or specially designed equipment, and/or by forced aeration.

Wood waste: Solid waste consisting of wood pieces or particles generated as a by-product or waste from the manufacturing of wood products, handling and storage of raw materials and trees and stumps. This includes, but is not limited to, sawdust, chips, shavings, bark, pulp, hog fuel, and log sort yard waste, but does not include wood pieces or particles containing chemical preservatives such as creosotepentachlorophenol or copper-chrome arsenate.

Yard waste: Grass clippings, leaves and weeds, andprunings from residences or businesses.

3.2 REFERENCES

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3.3 DISTRIBUTION LIST

Neighborhoods District and Community Councils

Ballard District Council
Central District Council
Delridge Neighborhoods District Council
Downtown District Council
East District Council
Fremont Neighborhood Council
Greater Duwamish District Council
Lake Union District Council
Magnolia/Queen Anne District
North District Council
Northeast District Council
Northwest District Council
South Park Community Club
South Park Redevelopment Committee
Southeast District Council
Southwest District Council
Wallingford Community Council

Other Organizations and Individuals

Business and Industry Recycling Venture
Environmental Coalition of South Seattle
Neighborhood Business Council
Robert McNeil
Solid Waste Advisory Council
Washington Citizens for Resource Conservation

Contracted Collectors

General Disposal
Northwest Waste Industries
Nuts 'n' Bolts Recycling
Sphere Solid Waste
U.S. Disposal & Recycle Seattle
Waste Management of Seattle
West Seattle Recycling

City Agencies

Citizens Service Bureau
City Light, Environment and Safety Division
DCLU, Land Use Review Section
DCLU, SEPA Public Information Center
Law Department
Mayor's Office
Office of Policy Planning
Seattle City Council, Utility and Environmental Management Committee

Libraries

City of Seattle Libraries, all 26 branches
UW Suzallo Library

Neighborhood Service Centers

Ballard Neighborhood Service Center
Capitol Hill Neighborhood Service Center
Central Neighborhood Service Center
Downtown Neighborhood Service Center
Fremont Neighborhood Service Center
Greater Duwamish District Neighborhood Service Center
Greenwood Neighborhood Service Center
Lake City Neighborhood Service Center
Queen Anne/Magnolia NSC
Southeast Neighborhood Service Center
Southwest Neighborhood Service Center
University Neighborhood Service Center
West Seattle Neighborhood Service Center

Other Agencies

City of Shoreline Planning Department
King County Department of Development and Environmental Services, SEPA Section
King County Executive Office
King County Metropolitan Services, Environmental Compliance Division
King County Solid Waste
Metropolitan King County Council
Pierce County Health Department
Puget Sound Air Pollution Control Authority
Seattle-King County Department of Public Health

Snohomish County Heath Department
US EPA Region X
WA DOE Environmental Review Section
WA DOE Northwest Region
WSDOT Environmental Review
WUTC Solid Waste Section